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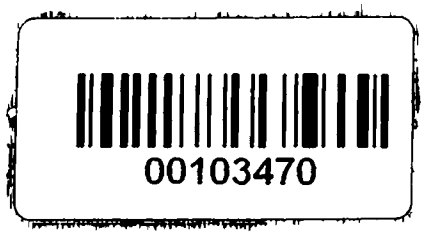

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JOURNAL

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ROYAL ASIATIC SOCIETY.

JANUARY, 1852.

ART. I.—*On the Villages and Towns named Hazar and Hazor in the Scriptures, with the Identification of the Hazor of Kedar.* By JOHN WILSON, D. D., F. R. S., Honorary President of the Bombay Branch of the Royal Asiatic Society.

Read, October 24th, 1850.

THE Hebrew words חצר HAZAR and חצור HAZOR, literally signifying an "enclosure," a "court," a "pasturage," and a "village," are used as the names of various towns and villages which have often been overlooked, confounded, and misplaced by writers on biblical geography and prophecy.

HAZEROTH was one of the stations of the Israelites in the wilderness. (Num. xi. 35; xii. 16; xxxiii. 17, 18.) It was doubtless situated in the valley of *el-Hadhar*, north of Mount Sinai.*

A HAZAR-*Addar* and HAZAR-*Enan* are spoken of in connection with the borders of the Holy Land. (Num. xxxiv. 4, 10.) The Canaanitish Avim are represented as dwelling in HAZERIM. (Deut. ii. 23.) In the apportionments of their land which fell to the tribes of Judah and Simeon we find several Hazors, mentioned in the following connections:—"And it [the south border of Judah] passed along [from Kadesh-barnea] to HEZRON, and went up to *Addar*," [probably the HAZOR-*Addar* of Num. *ut sup.*] (Josh. xv. 3.) "And the uttermost cities of the tribe of the children of Judah, toward the coast of Edom

* See "Lands of the Bible," Vol. I. pp. 256—260.

southward, were Kabzeel, and Eder, and Jagur, and Kinah, and Dimonah, and Adadah, and Kedesh, and HAZOR, and Ithnan, Ziph, and Telem, and Bealoth, and HAZOR-*Hadattah* [the "new Hazor," erroneously given in our English version as two different places], and Kerioth, and *Hezron*, which is HAZOR,* Amam, and Shema, and Moladah, and HAZAR-*Gaddah* [village of the kid], and Heshmon, and Beth-palet, and HAZAR-*Shual* [the village of the jackal], and Beersheba," etc. (Josh. xv. 21—28.) "And they [the children of Simeon accommodated in the tribe of Judah] had in their inheritance Beersheba, Sheba, and Moladah, and HAZAR-*Shual*, [already mentioned,] and Balah, and Azem, and Altolad, and Bethul, and Hormah, and Ziklag, and Beth-marcaboth, and HAZAR-*Susah* [the village of the horse]." (Josh. xix. 2—5.) "And they [the descendants of Simeon] dwelt at Beersheba, and Moladah, and HAZAR-*Shual* ..... and at Beth-marcaboth, and HAZAR-*Susim* [the village of horses, given before in the singular form]..... These were their cities unto the reign of David." (1 Chron. iv. 28—31.) None of these Hazars, so far as I know, have been identified in modern times, though the sites of some of the contiguous towns have been seen or visited by late travellers. This, however, is a matter of comparatively little consequence, as they are not associated with any historical events or prophetical descriptions of much consequence. HAZOR-*Gaddah* was probably near *Engedi*, the fountain of the kid.† The designation of HAZOR-*Susah* or *Susim*, proves the existence of the horse in the South of Canaan before the Israelites entered it under Joshua, a circumstance which is often overlooked. This animal was very scarce in the country till the time of Solomon. The Jewish kings were forbidden to multiply to themselves horses, probably to keep them, in their religious separation, from dependence on foreign countries, their own rough and hilly province not being in general suitable for rearing that quadruped.

A HAZOR, belonging to the tribe of Benjamin, is simply mentioned in Neh. xi. 33. It was probably not far from Bethel, and was perhaps identical with, or not far from, *Baal*-HAZOR, near Ephraim, at which Absalom's sheep-shearers were employed. (2 Sam. xiii. 23.)

HAZAR-*Hatticon*, (or the middle Hazor or village,) by the coast of Hauran, and HAZOR-*Enan*, by the border of Damascus, are mentioned by Ezekiel (xlvii. 16, 17,) in connection with the boundaries of the restored Holy Land.

* Mentioned also in Josh. xv. 3.

† Jerome and Eusebius say of *Gadda*, "Est autem hodieque villa in extremis finibus Dorymæ contra orientem, imminens Mari Mortuo.—Eclog. de Loc. Heb.

A more important place than those now referred to was the HAZOR of King Jabin, the capital of all the kingdoms adjoining the upper lake of the Jordan, which was taken and destroyed by Joshua, (Josh. xi. 1—13, &c.); which afterwards partially recovered its strength, and under another king of the name of Jabin, oppressed the Israelites, and sent out against them its armies under Sisera, when they were overcome by Deborah and Barak, its king being at the same time destroyed, (Jud. iv. 1—24; 1 Sam. xii. 9); which was rebuilt, or enlarged, by Solomon, (1 Kings ix. 15); and which was taken by the Assyrians, on their invasion of Canaan under Tiglath-Pileser, (2 Kings xv. 29). This strong and fenced city fell to the lot of the tribe of Naphtali, on the division of the land among the tribes of Israel. It is thus mentioned in the enumeration of their fenced cities, seemingly made from South to North :—"Ziddim, Zer, and Hammath [the warm baths near Tiberias], Rakkath [Tiberias],* and Chinnereth, and Adamah, and Ramah, and HAZOR, and Kedesh, [now Kades,] and Edrei, and EN-HAZOR, [the well of HAZOR,] and Iron [or Ijon]," &c. (Josh. xix. 35, 36). In the notice of the Assyrian conquests, it is thus given in an enumeration, probably proceeding from North to South :—"In the days of Pekah, king of Israel, came Tiglath-Pileser king of Assyria, and took Ijon, and Abel-beth-maachah, and Janoah, and Kedesh, and HAZOR, and Gilead, and Galilee, all the land of Naphtali, and carried them captive to Assyria." (2 Kings xv. 29.) It would appear that this Hazor lay to the South of Kedesh Naphtali, which is on the heights overlooking the waters of Merom, now called the Lake Huleh. Josephus (Antiq. v. 5, 1,) says that Hazor was situated above this lake, to which he gives the name Semechonitis (αὕτη δὲ ὑπερκεῖται τῆς Σεμεχωνίτιδος λίμνης). Eusebius and Jerome only allude to its situation as in the tribe of Naphtali.†

There is still another HAZOR mentioned in the Scriptures, and that in an important portion of the prophecies of Jeremiah :—

"CONCERNING KEDAR, AND CONCERNING THE KINGDOMS OF HAZOR, WHICH NEBUCHADREZZAR KING OF BABYLON SHALL SMITE, THUS SAITH THE LORD :—

Arise ye, go up to Kedar, and spoil the men of the East.
Their tents and their flocks shall they take away :
They shall take to themselves their curtains, and all their vessels and their camels ;
And they shall cry to them, Fear is on every side.
Flee, get you far off, dwell deep, O ye inhabitants of HAZOR, saith the Lord ;

* Talmud. Cod. Megill. fol. 5, col. 2 ; "Lands of the Bible," Vol. II. p. 117.

† Sub. voc. *Asor* :—"Asor, in tribu Nephtalim, quam rex Assyriorum populasse scribitur."—Heron. Ecloga de Loc. Heb.

For Nebuchadrezzar king of Babylon hath taken counsel against you,
And hath conceived a purpose against you.
Arise, get you up unto the wealthy nation that dwelleth without care, saith the Lord,
Which have neither gates nor bars, which dwell alone;
And their camels shall be a booty,
And the multitude of their cattle a spoil;
And I will scatter unto all winds them that are in the utmost corners,
And I will bring their calamity from all sides thereof, saith the Lord,
And HAZOR shall be a dwelling for dragons, and a desolation for ever:
There shall no man abide there, nor any son of man dwell in it."

(Jeremiah xlix. 28—33.)

HAZOR is evidently mentioned here as the *capital of Kedar*, in the same way as in the context Heshbon and Ai are spoken of as principal cities of Moab, and Bozrah as the capital of Edom. It is doomed by the prophet, not as an actual possession of the Israelites, such as Hazor in the neighbourhood of Kadesh Naphtali was, but as in a distant and hostile nation, that of *Kedar*, analogous in this respect to Edom, and Moab, and Elam, introduced to our notice in the same course of prophecy. It is represented as a secluded place, in the "East," and "in the utmost corners," the wealth of the dependencies of which principally consisted in flocks, and herds of camels, and in tents, and their equipages. It is obviously such a place as is not to be sought in a rough hilly country, where the latter description of animal would be found nearly or wholly useless. I request the members of our Society to mark these circumstances at the commencement of our inquiries as to its locality.

Dr. Keith, in the thirty-sixth edition of his admirable work on the "Evidence of the Truth of the Christian Religion, derived from the literal Fulfilment of Prophecy," says, with reference to the passage of Jeremiah now referred to:—"In the previous editions of this treatise, the author could not adduce any illustration of this prediction, after having long sought in vain for any recognition or identification of the city itself, either by historians or travellers, except the vague, and therefore unsatisfactory notice by Burckhardt, who had heard of but not seen 'the ruins of a city called Hazouri.'" He then goes on to identify the Hazor of Jeremiah with that of Jabin, repeating its history to the time of Solomon, and thus proceeds:—"'At the end of an hour and a half,' east by south from Paneas, on the route to Damascus, says Burckhardt, 'we came to *Ain-el-Hazouri*, a spring, with the tomb of Sheikh Othman-el-Hazouri, just over it; to the north of it one hour are the ruins of a city called *Hazouri*. The mountain here is overgrown with oaks, but contains good pasturage.'" "The name Hazouri,"

Dr. Keith adds, "Hazor is well known at Paneas: it designates the ruins; Ain Hazour, the fountain of Hazour; and Djebel-Hazour, the hill of Hazor. The ruins are not, as stated to Burckhardt, an hour's distance from the spring, but comparatively near it, on the opposite side of a grove of noble oaks..... The name remains, but the city is no more; and literally, as the word of the Lord revealed the existing fact, though long unknown in other lands, *no man abides there, nor does a son of man dwell in it.*"*

In this supposed identification, the excellent and learned author of the most popular work which has yet been published on the subject of which it treats, falls into three errors of considerable magnitude.

1. The "*Hazour*" of the flanks of Jebel Heish, above the castle of Banias, to which he here refers, cannot possibly be *Hazor*, the capital of Jabin. This site is quite separated from the possessions of the tribe of Naphtali, in which that town, as we have seen, was situated. It is east of the territory formerly belonging to the Sidonians, and ultimately taken possession of by the tribe of Dan. It lies to the east of the Jordan, in the territories which, in the Land of Promise, we know were allotted to the tribes of Reuben and Gad, and the half tribe of Manasseh.

2. The *Hazor of Jabin* is not the *Hazor mentioned by Jeremiah*, which, as we have already seen, is connected with *Kedar and Arabia.*

3. The *Hazor of Jebel Heish*, also, has no geographical connexion with *Kedar and Arabia*, from which it is quite remote. In its lofty position, among the roughnesses of the mountains, it is perhaps one of the last places which could be thought of as the capital of a country abounding with camels.†

Dr. Eadie, a countryman of Dr. Keith, in his convenient Biblical Encyclopædia lately published, has avoided confounding the Hazor

* Keith on the Evidence of Prophecy, pp. 150—153.

† Since this paper was laid before the Society, the Journal of the Royal Asiatic Society, Vol. XII. Part 2, has been received in India. At page 359, I find the following statement in the late Capt. Newbold's paper "On the Country between Tyre and Sidon and the Jordan":—"My friend the Rev. Mr. Thomson, of Beirút, suggested to me the examination of Hunin as the site of the great Hazor, so celebrated in the days of Joshua, and subsequently. I am, however, inclined to think that Hazor lay further East, and that its site is pointed out by a mound in the valley of the Jordan, between Hasbeiya and Banias, called by the Arabs Tel Gházor." Mr. Thomson may be correct in his conjecture about the identity of Húnin and the Hazor of Jabin; but as there is no similarity in the name, and several ancient sites of Naphtali in this district remain yet undiscovered, there is yet no certainty about the matter. Captain Newbold has overlooked the fact that the Arabic correspondent of Hazor is *Hadhor*, and not *Gházor*.

mentioned by Jeremiah with that of Jabin. "There is a remarkable prophecy," he says, "respecting a Hazor in Jer. xlix. 28—33. The connection shows it to have been in Arabia, and the whole scope of the prophecy denotes a place of great importance. It is, however, blotted out, though some have conjectured that it is another name for Petra."

So many places mentioned in Scripture, which have for ages disappeared from the view of the civilized world, have been lately brought to notice, that we have not despaired of the recovery of even this HAZOR. Before hazarding an opinion, however, on its situation, we have to seek for the district of KEDAR itself, with which, as we have seen, it is associated by Jeremiah.

The country of KEDAR derived its name from Kedar the son of Ishmael. (Gen. xxv. 13.) In several passages of the sacred Scriptures it is connected with Arabia. (Isaiah xxi. 13—16; Ezek. xxvii. 21.) Its people are alluded to as dwelling in tents, and, according to some interpreters, with the sons of Kedemeh, settled in the "East,"* as in the passage we have introduced from Jeremiah. (Song i. 5; Ps. cxx. 5.) Pliny couples its people, the Cedrei, with the Nabatai,† the descendants of Nebaioth, the eldest brother of Kedar. The Chaldæan paraphrast identifies these people (Ezek. xxvii. 21), and he translates the "flocks of *Kedar*" (Is. lx. 7) the "flocks of the Arabs."‡ Jerome, in his comment on Isaiah, says that Kedar was "an inhabited region beyond Arabia of the Saracens"; and in his Loc. Heb. that it was in the "wilderness of the Saracens." Eusebius and Jerome, in the Ecloga, or Onomasticon, place this wilderness of the Saracens "beyond Arabia to the South," "opposite the coast of the Red Sea." Theodoretus, commenting on Psalm cxix., says: "Kedar was the second son of Ishmael, and his posterity dwell to this day not far distant from Babylon." Suidas in his Lexicon makes the same remark, adding that Kedar is a place of obscurity, for in Hebrew it denotes what is dark.

It appears to me that according to these authorities Kedar, dis-

* Bochart thus writes:—"Jacobus ὁ μακαρίτης, affinis meus, quem honoris causâ nomino, hunc nodum ita conatur exsolvere in notis ad Genesin nondum editis: *Noæ posteritas ab Armeniæ montibus progressa fuerat in eam regionem quæ postea dicta est* קדם *Kedem a Kedmâ novissimo Ismaelis filio.* Gen. xxv. 15. *Secundus Ismaelis filius est Kedar. Hos duos fratres vicinas habuisse sedes colligimus ex Jerem.* xlix. 28. *Ascendite Kedar ut vastentur filii Kedem. Postea vero cum inquit Moses,* Gen. xi. 2, *egrederentur ex Kedemo invenerunt vallem in terra Senaaris. Sic locum hunc interpretandum censemus.*"—Phaleg. i. 7.

† Plin. lib. v. cap. 22.

‡ Reland Palest. p. 96.

tinctively so called, is to be sought in the Eastern portion of that part of Arabia, according to the ancients, which is now called the Syrian desert, or in the country contiguous to that wilderness; and the question arises, Is there any Hazor whose position and other circumstances suit the description of Jeremiah to be found in that region of the world? That the Hazor of Jeremiah,—if without authority we extend the name Kedar to the Arabian peninsula,—could not be in the south of Arabia, will afterwards appear.

To the question now proposed I venture to reply in the affimative. In a remarkable oasis of the desert and alluvial plains between the Tigris and the Euphrates, lying to the S. W. of Mosul, there is a town, the Arabic name of which حضر or الحضر,—*Hadhar*, or *el-Hadhar*, given by the Arabic geographer Edrisi,—is the exact correspondent of the Hebrew חצר HAZAR or HAZOR. He speaks of this place as an "agreeable town on the banks of the Tirthar."* This place, though its coincidence with the Hazor of Jeremiah has not yet been noticed, has been identified by Major Rennell and others as the *Hatra* of Ammianus Marcellinus, (lib. 25, cap. 8,) the *Atra* of Dion Cassius, (lib. 24,) and the *Hatris* of the Peutingerian tables.

This place was visited a few years ago by Dr. Ross, of the Bombay Medical Service, whose interesting memoir of it is published in the Journal of the Royal Geographical Society, and afterwards by Mr. W. F. Ainsworth, who has given a full and interesting description of it in his "Travels and Researches in Asia Minor, Mesopotamia, Chaldea, and Armenia." From the narrative of the last-mentioned gentleman, I take the liberty of introducing one or two important passages explanatory of its position and present appearances.

The following is a notice of the journey of Mr. Ainsworth and his party to *Hadhar*, from Kalah Sherkat:—"At Kalah Sherkat it was my intention to quit the river's banks, and penetrate the wilderness to Al-Hadhar, guided by the compass and Mr. Ross's map, for neither the Khawas nor the Arabs knew aught about the position of the ruins. On leaving Kalah Sherkat, we kept a little to the South of Wadi-el-Meheih, in which there was now no running water.....We travelled at a quick pace over a continuous prairie of grasses and flowering plants, and, crossing the Ain-el-Thaleb, having still a little stagnant water, we arrived at a ridge of rocks which rose above the surrounding country. From a mound, upon which were a few graves, we obtained a comprehensive view of that part of Mesopotamia which extended to the West, but without being able to distinguish the valley of the Thar-

* Geog. d'Edrisi, par Jaubert, p. 147.

thar, a brook which traverses this part of Mesopotamia, or the ruins of Al-Hadhar.....The sharp sight of the Bedwin Haji Ali was in favour of some mounds which were visible in the extreme distance to the South of West; so, having much confidence in his acquaintance with the appearance that ruins would present on the desert at such a distance, we followed these indications, but, as it turned out, fallaciously. After two hours and a quarter's quick travelling, still over prairies and undulating country, we came to the supposed ruins, which turned out to be bare hills of sandstone, the Southern termination of a low ridge.....Changing our route, we started to the North-West, in which direction we arrived, after an hour and a quarter's ride, at a valley bounded in places by rock terraces of gypsum, which indicated a wadi and a winter torrent, or actual water. To our joy, we found the Tharthar flowing along the bottom of this vale, but only from fifteen to twenty feet in width, instead of the fifty we had been led to expect; and to our great comfort the waters were very potable. The stream, though narrow, was deep, generally from five to seven feet, and hence with difficulty fordable: on its banks were a few reeds and scattered bushes of tamarisk. We proceeded up the stream, in a direction North-West, in search of a ford, which we found after one hour's slow and irregular journey, and we lost half an hour refreshing ourselves with a bath. We afterwards followed the right bank of the stream, being unwilling, as evening was coming on, to separate ourselves, unless we actually saw Al-Hadhar, from the water so necessary for ourselves and our horses.....We deemed it best to keep on up the river, but to travel a little inwards on the heights. This plan was attended with perfect success; and we had ridden only one hour and a half, when we perceived through the misty rain mounds still to the North-West, which we felt convinced were the sought-for ruins. Mr. Rassam and myself hurried on, but soon afterwards, perceiving a flock of sheep in the distance, we became aware of the presence of Arabs, who could be no other than the Shammar; so we waited for our friends, and rode all together into the kind of hollow in which Al-Hadhar is situated. Here we perceived the tents of the Bedwins extending far and wide within the ruins, and without the walls to the South-West. The ruins themselves presented a magnificent appearance, and the distance at which the tall bastions appeared to rise, as if by enchantment, out of the wilderness, filled us with wonder and surprise, no doubt in great part due not only to the splendour of the ruins, but also to the strange place where the traveller meets with them—'in *medid solitudine*,' as Ammianus so briefly, but so correctly expresses it."

The ruins of Hadhar, Mr. Ainsworth goes on to inform us, present the remains of a palace and temple, "surpassing, in extent and perfection, the arch of Chosroes at Ctesiphon, the residence of the Kings of Persia, of the Arsacidan dynasty."*

"It consisted," he continues, "of a series of vaulted chambers, or halls, of different sizes, all opening to the East, or towards the rising sun and planets, and regularly succeeding one another from north to south, and was divided into two parts by a wall; while in front was another row of edifices, guard-houses, &c. &c., at the southern end of which was a great hall, with an ornamented vault and tall columns, similar to what is observed in the chief edifice. The whole of these buildings were enclosed within a wall about 1360 yards square, which left a considerable space open in front, and this open square was in the exact centre of the town, which is nearly a perfect circle, surrounded by a rampart, about 3 miles 180 yards in circumference. Portions of the curtain, which was 10 feet 3 inches in width, still remain on this rampart; and there are also the ruins of thirty-two bastions, placed at unequal intervals. The space occupied by the town still contains the ruins of tombs, and other edifices, and is everywhere covered by mounds of ruined buildings. There is also a spring, and a channel for water, not straight, but tortuous, which crosses the town; and there were apparently four gates, having straight roads leading from them to the central edifice. Every stone, not only in the chief building, but in the walls and bastions, and other public monuments, when not defaced by time, is marked with a character, which is, for the most part, either a Chaldaic letter or numeral.....The southerly hall, which is small, has externally every stone in the arch sculptured in high relief, with a human bust, some of which have very singular curling bag-wigs, or, more probably, a peculiar mode of dressing hair, which we know to be common in Persian sculptures, but those, I believe, only of a modern date, or more particularly of the time of the Sassanian dynasty.† The second hall is of greater dimensions, and the figures on the arch were those of angels, or females, apparently in the air, with feet crossed, and robes flying loose; while in the interior, on both sides of the hall, were three square pilasters, surmounted by full round faces, in high relief, and executed with considerable fidelity and spirit. While the style of these sculptures appears to be pretty nearly uniform, it is impossible not to recognise costumes differing much from one

* Travels in Asia Minor, &c. vol. ii. pp. 159—162.

† But the bag-wigs, as they are here called, have also been found in the ancient Assyrian ruins near Mosul.

another. Indeed, it requires but little imagination to figure to oneself in these sculptures the representations of the successive powers who ruled the City of the Desert. The simple turban-like head-dress represents the Chaldean; the bearded physiognomy and scattered hair, the Persian satrap; the laurel-leaved band, supporting eagles' wings, the Roman; while the binding round the head, like a double fold of rope, as it is also described by Mr. Ross, appears the original of the present Arab head-dress.....It may be advanced against this view of the subject, that if the building is all of one style, this style must also be carried through all its details, and that we cannot expect that any of the decorations can be illustrative of different periods; but there is no reason why, if the Parthians or Persians borrowed their style from the Romans, they still might not have introduced their own sculpture, as at Persepolis; or, if the Romans built the great monument of Al-Hadhar, they might equally have been influenced by a conquered people to introduce, as well as letters, forms sacred to their religion, or gratifying to their pride and to their national reminiscences. On the face of the wall of this great hall, besides the signs before mentioned, are two inscriptions, one in Chaldaic, the other in Arabic, both cut in the stones, but which run along from one to another, and are evidently more modern than the building.....The Arabic inscription was copied and translated by Mr. Rassam; its purport is as follows:—'Mesud Ibn Maudud Ibn Tamanki, the just king, protector of religion, and defender of the faith, in humble service, and seeking mercy from his Lord, caused this to be repaired in the year of the Hejira 586.' (A. D. 1190.) This evidences the fact that Al-Hadhar was an inhabited town in the time of the Ata Beys of Mosul, for Azzud-din Mesud Ibn Maudud reigned there from A. D. 1180 to 1193; yet it is mentioned as deserted at the period of the retreat of Julian's army. With the assistance of lights, we examined the subterranean rooms connected with the first great hall, but did not find anything of interest. In the rear of the same great hall is another apartment, surrounded by a lofty vaulted passage. From its beautifully ornamented doorway, and complete seclusion from the other parts of the edifice, it may be conjectured to have been a religious sanctuary. Over the doorway is the most beautifully sculptured relief in the whole building; it represents griffins supporting heads, human and others, and in the centre is the head of Apollo, or Mithra, supported by eagles, with scrolls in their mouths; beneath is some beautifully-sculptured foliage: it is evidently of Roman execution.....At the first small hall of the Northern division, the sculptures over the arch of the entrance are among the most perfect

of the out-of-door sculptures. They appear to be alternations of male and female heads, the first having the peculiar head-dress previously noticed, while the latter present a remarkable similarity to the present style of dress in Western Europe. Some of the ladies have dresses like corsets, terminating in a point. Most of them wear tiaras of jewels; some have necklaces; and the bust is neatly and only partially displayed. The hair falls on the shoulders of some in a profusion of ringlets; in others is trimmed up in large curls, and again in some puffed out behind, as was once the case at the French court. On the wall is also the sculpture of a monstrous animal. The walls were measured, in all their details of bastions, &c., and were found to be 5460 yards round. .....Within the circuit of the walls were many ruins of doubtful character.....Some of these buildings are square, and they are of different sizes. One, ornamented with pillars, had two interior vaulted chambers, with an outer vaulted hall, and a stair leading to the top, as if to sleep upon it, as is the custom at Mosul and Baghdad. The openings to let in light are more like loopholes than windows, but this may have been for coolness, and from want of glass, as is observed in the cottages of the peasants in the East. A large square building, with one vaulted chamber, which appears to have been a small temple, or mausoleum, occurs on theNorthern side. It is built upon a handsome basement, with a projecting but simple cornice. I ought not to omit to mention that the pear-shaped cavities common in Syria are also met with amid the ruins here."*

Mr. Ainsworth has collected together some of the most important historical notices of this long-overlooked city of the desert. He says: "It is evident, from the character of the greater number of the letters and signs inscribed on the hewn stones, that the original builders were Chaldeans or Chaldees.....It is further evident that in the course of the changes which befel all the great powers in the East, that this city was ruled by Armenians, by Persians, and by Romans. According to Dion Cassius, by Xiphilinus, Trajan, after his descent of the Tigris and Euphrates, and having proclaimed Parthamaspates king at Ctesiphon, entered *Arabia*, against Atra, but want of water and provisions, with great heats, drove him away. In the time of Arsaces (Ardawan), Septimius Severus, who also returned by the Tigris from Ctesiphon, besieged this city, upon which occasion his machines were burnt by the 'Greek fire,' which appears to have been the bitumen so abundant in the neighbourhood. His men also were slain; and for want of provisions, and after twenty days' siege, the Roman emperor was forced to

* Travels in Asia Minor, &c. vol. ii. pp. 163—172.

retreat. Thus did this remarkable city, from the peculiarity of its position in the midst of a treeless desert, with one well of water and the brackish brook of the Tharthar flowing by, superadded to the skill, science, and determination of its inhabitants, successfully resist the all-conquering arms of the Romans. This period of the history of Hatra is succeeded by another interval of impenetrable obscurity. No sculpture nor monuments of any kind indicate the existence of a Christian community within its walls, which is the more remarkable as Nisibin became the seat of a patriarch, and Al Hadhar was in the centre of a newly-converted and eminently Christian people."*

Dr. Layard, in his great work on "Nineveh and its Remains," gives a brief account of a journey which he paid to Hadhar. The following is the interesting notice which he takes of the locality itself:—

"A dark thunder cloud rose behind the time-worn ruins of Al-Hather as we approached them. The sun, still throwing its rays upon the walls and palace, lighted up the yellow stones until they shined like gold.† Mr. Ross and myself, accompanied by an Arab, urged our horses onwards, that we might escape the coming storm; but it burst upon us in its fury ere we reached the palace. The lightning played through the vast buildings, the thunder re-echoed through its deserted halls, and the hail compelled us to rein up our horses, and turn our backs to the tempest. It was a fit moment to enter such ruins as these. They rose in solitary grandeur in the midst of a desert, 'in *medid solitudine positæ*,' as they stood fifteen centuries before, when described by the Roman historian. On my previous visit the first view I obtained of Al-Hather was perhaps no less striking..... At that time within the walls were the tents of some Shammar Arabs, but now as we crossed the confused heaps of fragments, forming a circle round the city, we saw that the place was tenantless. Flocks on a neighbouring rising ground showed, however, that Arabs were not distant. We pitched our tents in the great court-yard in front of the palace, and near the entrance to the inner inclosure. During the three days we remained amongst the ruins I had ample time to take accurate measurements, and to make plans of the various buildings still partly standing within the walls.....Suffice it to mention that the walls of the city, flanked by numerous towers, form almost a complete circle, in the

* Travels in Asia Minor, &c., vol. ii. pp. 172—174.

† The rich golden tint of the lime-stone, of which the great monuments of Syria are built, is known to every traveller in that country. The ruins of Al-Hather have the same bright colour: they look as if they had been steeped in the sunbeams.

centre of which rises the palace; an edifice of great magnificence, solidly constructed of squared stones, and elaborately sculptured with figures and ornaments. It dates probably from the reign of one of the Sassanian kings of Persia, certainly not prior to the Arsacian dynasty, *although the city itself was, I have little doubt, founded at a very early period.* The marks upon all the stones, which appear to be either a builder's sign, or to have reference to some religious observance, are found in most of the buildings of Sassanian origin in Persia, Babylonia, and Susiana."*

It will be seen from this notice, that Dr. Layard agrees with Mr. Ainsworth in ascribing a very high antiquity to this city, though he considers its most important architectural remains to be those of the Sasanidan Persian dynasty, the epoch of which was from A. D. 202 to the middle of the 6th century after Christ. Considering how early the parts of the world,—including even the deserts,—in which it is situated were peopled, we have no difficulty in supposing that it had come to its maturity long before the days of Jeremiah, about six hundred years before Christ; and that as an independent power, or as an ally of some other state, it had placed, or was about to place, itself in an attitude of hostility to the Israelites, either in their own land, or by the interruption of their commerce,—to facilitate which Solomon had built, or rebuilt, the neighbouring, and, it is to be noticed, analogous, Tadmor in the wilderness,—or by the distress of their families during the exile, so as thus to call forth the doom of the inspired prophet. Its situation is placed in Arabia by Greek and Roman writers, as is well shown in the subjoined note by Reimar, applied to the notice taken of it by Dion Cassius.†

* Layard's Nineveh, Vol. I. pp. 108—110. Dr. L. says in a note, "Many of these marks are given in Mr. Ainsworth's Memoir in the Journal of the Royal Geographical Society. They are not letters of any one particular alphabet, but they are signs of all kinds. I discovered similar marks at Bisutun, Isphahan, Shuster, and other places in Persia where Sassanian buildings appear to have existed."

† Ἐς τὴν Ἀραβίαν ἦλθε, κ. τ. λ. Arabiam intelligo quæ erat inter Euphratem et Tigrim posita. Sic infra p. 854. D. Severus in transitu per Mesopotamiam Atra aggreditur, ubi Dio tamen eam urbem Arabibus tribuit. p. 855. B. D. *Stephanus Byz.* ex Arriani lib. xvii. Parthicorum: Ἄτραι πόλις μεταξὺ Εὐφράτου καὶ Τίγρητος. Rursus autem in Ἀιβαναὶ, ex eodem Arriano: πόλις Συρίας ταῖς Ἄτραις γειτνιαζούσῃ. Sic et Abgarus Edessa regulus τῶν Ἀραβίων vocatur. Erat ergo Atra urbs Arabiæ, qua se ultra Euphratem in Mesopotamiam porrigebat; quam Arabiam Mesopotamia seu Syria describit, etiam *Xenophon* de Exp. Cyri, p. 255, velut desertam. *Herodianus* in Severo III. 9, 6. Atra refert ad εὐδαίμονα Ἀραβίαν confundens, credo, cum Ἄγρα Arabiæ Felicis,

This perfectly agrees with the indications to which we have already referred connected with KEDAR, the position of which is spoken of either definitely in connection with the Eastern desert, or indefinitely, as in "Arabia." It suits, in a striking manner, the exigencies of the passage in Jeremiah, as far as the pastoral wealth of *Hazor* in cattle and camels is concerned; for even at this day the Nomadic Arabs, particularly the Hadadin and Shamar, are abundant in its neighbourhood, with property of this character, as the nature of the country would indicate some similar wandering tribes must have probably been from time immemorial. Situated in a tolerably fertile oasis, and surrounded by deserts on all sides, its people would of old, comparatively speaking, "dwell without care," and, in many places, "have neither gates nor bars," but "dwell alone." It was within the reach of Nebuchadnezzar, the appointed instrument of its punishment and its complete destruction, as far as its people who had called down the divine vengeance are concerned, which can scarcely be said to be the case with any city of Kedar, if the country be located, as some would have it, contrary to all historical and geographical evidence, in the more remote or southern districts of Arabia. These circumstances, combined with the identity of its Arabic name, *Hadhar*, and the similarity of its Syro-Chaldaic name, *Hatra*, with the Scripture HAZOR, warrant us, I submit, to come to the conclusion that the site of the HAZOR of KEDAR, so long amissing, has now been found. The desolations of the locality, and its want of a settled population for many ages, form an ultimate state for the prophetic epoch corresponding with the language of Jeremiah:—

"And Hazor shall be a dwelling for dragons, and a desolation for ever,
There shall no man abide there, nor any son of man dwell in it."

On the extent of this prophetic epoch it is not necessary to say anything in this place.

quam Ælius Gallus oppugnaverat, teste *Strabone* XVI. p. 781. Certe, etiam si ultra Euphratem excurrisset Severus, tamen longe a Felici Arabia aberat, pedemque potius in Desertam tulisset. Hic apud Dionem scriptum quidem erat τοῖς Ἀγαρηνοῖς sed librariorum, puto, confusione, ex literis nata. Nam Γ et Τ sæpissime a librariis permutari multis exemplis constat, et observarit *Salmasius* ad Solin. p. 498. *b*. F. Dio sane, seu Xiphilinus eandem se dicit urbem designare quam Severus frustra oppugnavit, cujus muri partem diruit Soli dicatam, qua Atra rectius infra vocatur.—Dion. Cass. Hist. Roman. p. 1144, not. 190.

ART. II.—*Observations on the Grammatical Structure of the Vernacular Languages of India.* By the Rev. J. STEVENSON, D. D.

No. 4.—THE PRONOUN.

Read August 1851.

THE pronoun is said to be "a word used in place of a noun"; it may be questioned, however, whether words can perform their duties by deputy, and whether pronouns do nothing more than supply the place of nouns. Without such words, "designating the persons to whom and of whom we speak," we should very soon become unintelligible; and even the rudest barbarians have found such words essential for their unartificial vehicles of communication.

The pronouns, like the numerals of the vernacular languages of India, may be pretty definitely distributed, according to their origin, into the two great classes of Northern and Southern families; those of the former being mere corruptions of the Sanscrit, and those of the latter of a peculiar type, more allied to the Turanian than to the Sanscrit. The Singhalese is here also to be classed with the Northern family.

The pronoun of the first person singular offers connections which carry us over all the European and Asiatic continents. The Northern family is connected with the Sanscrit, and the languages of the centre and North West of Asia, and the whole of Europe. The Southern is allied to the languages of Arabia and Syria, on the one hand, and on the other with the Chinese family.

Each of these, again, is divided into two subdivisions, which, however, seem rather to have been the result of accident than of any deep-seated analogies. The following tables will illustrate these positions:—

I.—Connections of the North-Indian Family.

1st.—Words for *I*, connected with *Aham*, the Sanscrit Nominative :—

Sanscrit.	Persian of the Behistun Inscriptions.	Pehlavi.	Gujaráthi.	Cashmerian.	Sclavonian.	Yenissean* (in Siberia).	Spanish.	Greek and Latin.	Portuguese.	Danish.	French.	German.	Dutch.	English.
Aham	Adam	Afum	Hun	Boh	As	Ya	Yo	Ego	Eu	Ei	Je	Ich	Ik	I

2nd.—Words for *I*, connected with the Sanscrit Accusative *Má* :—

Modern Persian.	Singhalese.	Hindi.	Maráthi.	Bengáli.	Uriya.	French.	Italian.	Celtic.	Scindian.
Man	Mama	Main	Mí	Múi	Mú	Moi	Mi	Mi	Mán

II.—Connections of the South-Indian Family.

1st.—Connections of the Ancient Canarese *A'n* :—

Ancient Canarese.	Ancient Tamil.	Modern Tamil.	Modern Canarese.	Telugu.	Kurgi.	Todava.	Tuluva.	Tetenge,† in Assam.	Lar, in Scinde.	Chaldee & Arabic.	Hebrew.	Syriac	Central Indian Hill Tribes.‡		
													Uráon.	Rajamahali.	Gondi.
A'n	Yán	Nán	Nánu	Nenu	Nán	A'n	En	Ne	Awn	Ana	Ani	Eno	Enan	En	Mani

2nd.—Connections of the Malyálim Nyán :—

Malyálim.	Tibetan.	Kamschatkan.*	Burmese.	Arracanese.	Hákot and Khot, in Assam.	Malapa,† in Assam.	Chinese.	Singhbum Kol.‡	Santal Hill Tribe.‡	Mundala Hill Tribe.‡
Nyán	Nga	Ganny	Nga	Nga	Ngá	Ngai	Ngo	Aing	Inge	Ing

* The words thus marked are taken from Klaproth's "Asia Polyglotta."

† The words thus marked are from a valuable paper in the Calcutta Asiatic Society's Journal, by Mr. Robertson.

‡ The words of the Hill Tribes are from Mr. Hodgson's Collections.

From this table it appears—

1st, That the ancient aboriginal pronoun of the first person singular has been lost out of the Northern family nearly altogether, and corruptions of the Sanscrit substituted. One solitary connection between the ancient Canarese and a Scindian dialect remains to attest any relation between the Northern and Southern families.

2nd, That the old pronoun in a modified form still keeps its place in the dialects of several of the Hill tribes.

3rd, That it has a connection on the one hand with the Syro-Arabic family, and on the other with the Tibetan and Chinese.

In taking a survey of the other pronouns, similar but less striking coincidences occur. The Twam of the Sanscrit in the softened forms of tu, tu*n*, tue*n*, &c., pervades the Northern family, and the *Ni* of the Tamil the Southern and Hill tribes, as the following table will show.

Forms of the singular of the pronoun of the 2nd person :—

Tamil.	Malyalim.	Telugu.	Canarese.	Kurgi.	Todava.	Urâon.	Rajamáhali.
Ni	Ni	Nivu	Ninu	Nin	Ni	Nin	Nin

In reference to the pronoun of the 3rd person, we may remark that wah or wo of the Hindí comes nearer the awan of the Tamil, and some other Southern languages, as well as the (هو) hu of the Arabic, the kho of the Tibetan, and the (و and ول) o and ol of the Turkish, than the (स :) sa*h* of the Sanscrit.

One of the striking peculiarities of the Indian pronouns is the class of honorific pronouns, which pervades them all more or less.

In the Southern family, including the Singhalese, and in the Bengáli and Uriya of the Northern family, we have a regular singular form, honorific form, and plural form, for the personal pronouns. In the rest of the Northern family, one word, the *A'p* of the Hindí, *A'pun* of the Marathi, &c. stands for them all. These words, indeed, are translated *self*, yet they are not used like our word *self*, with other personal pronouns, but as a substitute for them, and usually to denote honor or respect, and cannot be translated by any one English word. They are often used where we would say *Your Majesty*, *Your Honor*, &c. The भवान *Bhaván* of the Sanscrit is used much in the same way, but it seems easier to derive the word (आपन) *Apan*, the original in the vernaculars, from the Tamil Avan, by the common change of *v* into *p*, than from any other source. This system of using honorific pronouns connects the Indian languages with the Tibetan, Chinese, Japanese, Indo-Chinese languages, and the dialects of the Central Indian Hill tribes, especially of the Sontals.

There is a most singular idiom mentioned in the Tamil, Malayálim, Telugu, Maráthi, and Gujaráthi grammars, as pervading all those languages, and I strongly suspect not confined to them. It is a double pronoun, of the first person plural, the one form taking in the whole of the persons present, and the other only one party, if there be more parties than one. In these tongues the common plural is used to designate the plurality of a party, and the honorific pronoun to include the whole assembly. Thus, the Tamil Nánggal means *we* of the one party as opposed to you of the other, while the honorific *Nám* takes in all parties present. In the Gujarathi, *Hame* is we of the one party, and *Apane* is we including the whole company ; and so of the others above mentioned. A rather laughable instance of the danger of neglecting this distinction, (a mistake so frequently made by foreigners,) I once witnessed in a European, who was addressing a company of natives in their own language. He, while uttering some truths which he meant to apply to mankind in general, used the wrong *we*. A native immediately retorted, " True, that is *your* character ; but *ours* is very different." This characteristic, be it noticed, we have traced by these five languages in one continuous line from Cape Comorin to the Indus ; and it is not likely such a singular idiom could have got into all these tongues by accident, or have been borrowed from one by the others in modern times ; and it is not a Sanscrit idiom.

Another singular coincidence between the Tamil and Gujarathi exists in the use of the particle A' (आ) as a demonstrative pronoun. This particle is also used in the same sense in some other of the Southern tongues, and connected with it in other Northern languages, we may reckon the Maráthi Há, hí, he*n* ; the Singhalese and Bengáli E ; the Scindian He ; the Panjabi Eh, and even the Hindostáni Yih.

In the Northern family, relative pronouns generally follow the rule of the Sanscrit, and are but corruptions of the Sanscrit (य:) Ya*h*. This pronoun would more accurately be translated by *whoever*, or in Latin by *quicunque*, than by *who* and *qui*, or in other connections by *what*. In the Southern tongues, again, there is no relative, and its want is usually made up by the participial termination. Even in the Northern family this is allowable ; and, moreover, the relative is rarely supplied in familiar discourse, while the demonstrative pronoun, which is sometimes called a co-relative, must never be omitted, whether the relative be used or not. A common Hindu would rather say *Chori kiyí wuhi hai*, than *Jo chori*, &c. although the latter be the form generally used in books, and by the learned. No one, however, would

use such a phrase as the following : "The man who was here yesterday is come again to-day." The demonstrative pronoun *he*, which we omit before "is come," is essential to a Hindu; while the *who*, which is essential to us, is indifferent to him.

The cases of pronouns are formed much in the same way as those of nouns, as will be seen from the example we give below of the declension of the pronoun of the second person. There is, however, one striking connection between the Northern and Southern families, which comes out chiefly in the pronouns. It is the relation that subsists between the *re* of the genitive in the Hindí and several of the other languages, and *rhe* in the Malyálim. This latter is evidently the original, as the harsh *rh* used does not belong to the Sanscrit, or to any of the Northern tongues. The Northern form, then, is evidently a softening of the original Southern syllable. It may be worth while, also, in passing, to notice the coincidences pointed out before between the termination of the dative in so many of the Southern and Northern families, and those of the accusative in a few of them; all of which are entirely independent of any Sanscrit influence.

I think, then, we have traced in several instances a thread of connection, though often but a slender one, running through the Northern and Southern families, and showing the influence on all, more or less, of an ancient aboriginal tongue, entirely different from the language of the Brahmans.

As illustrations of the subject in hand, the two following tables, the former showing the inflexions of the pronoun of the second person in some of the hill-tribe dialects, and the second the same in the languages of the plains, will be found worthy of attention. The two first are from Hodgson's papers, and the three last from Robinson's, in the Journal of the Asiatic Society of Bengal.

PRONOUN OF THE 2ND PERSON IN THE DIALECTS OF THE HILL-TRIBES.

SINGULAR.

	Nom.	*Gen.*	*Dat.*	*Acc.*	*Ins.*	*Loc.*
Bodo	Nang	Nang-ni	-no	-kho	-jang	-now
Dhimal	Ná	Náng-ko	Neng	Neng	Nang-dong	Náng-ta
Garo	Náá	Nangni	-na	-kho	-chi	-o
Káchári	Nang	-ni	-no	-kho	-jang	-niáo
Miri	No	Nogke	-kepe	Nom	-koki	-lo

PLURAL.

Bodo	Nangchur	-ni	-no	-kho	-jong	-noa
Dhimal	Nyel	Ningko	-eng	-eng	-dong	-ta
Garo	Nasimong	-ni	-na	-kho	-chi	-o
Káchári	Nangsur	-ni	-no	-kho	-nijang	-niáo
Miri	Nólu	-g	-kepe	Nolum	-koki	-lo

Inflexions of the Pronoun of the Second Person.

Inflexions of the Singular Number.

	Sanscrit.	*Hindi.*	*Panjábi.*	*Gujaráthi.*	*Maráthi.*	*Singhalese.*	*Scindian.*	*Bengáli.*	*Uriya.*	*Telinga.*	*Canarese.*	*Támil.*	*Malyálim.*
NOMINATIVE—	Tvam	Tun	Tun	Túm	Túm	To	Tun	Túi	Tú	Nivu	Ninu	Niya	Ni
GENITIVE—	Tava *or* To	Tere	Toro	Taháruṅ	Tuzhen	Tage	Tojo	Tora	Tora	Niyokka	Ninna	Unadu	Ninrhe*
DATIVE—	Tubhyam	Tujhko	Tainúm	Tane	Tula	Tata	Tokhe	Toro	Tote	Niku	Ninage	Unaka	Nannikka
ACCUSATIVE—	Tvám	Tujhe	Tainúm	Tane	Tula-te	Ta	Tokhe	Toke	Tote	Ninna	Ninnanu	Unnai	Ninne
INSTRUMENTAL—	Tvayá	Tune	Taina	Tue	Tvá		To	Tote	Toro	Nicheta	Ninninda	Unnál	Ninnál
LOCATIVE—	Tvayi									Nilo	Ninnil	Unnanil	Ninnalli

Inflexions of the Plural.

NOMINATIVE—	Yuyam	Tum	Túsiṅ	Tame	Tumhi	Topi	Tahiṅ	Tomará	Tumbhamáni	Miru	Nivu	Ninggal	Ningngal
GENITIVE—	Yushmákam	Tumáre	Tuháddá	Tamárúṅ	Tumatsen	Topo	Tahaṅ	Tomádigera	Tumbhamáningkara	Miyokka	Nimma	Unggal	Ningngate
DATIVE—	Yushmábhyam	Tumko	Tuhánúm	Tamne	Tumhálá	Topata	Tahánkhe	Tomadigero	——————ku	Miku	Nimage	Unggalaku	Ningngalikku
ACCUSATIVE—	Yushmán	Tumhe	Tuhánúm	Tamne	Tumhás	Topa	Tahankhe	Tomádigko	——————ku	Mimmu	Nimanna	Unggalai	Ningngale
INSTRUMENTAL—	Yushmabhiṅ	Tumne	Tusiṅ	Tamoe	Tumhiṅ		Tahán	Tomádigete	——————re	Micheta	Niminda	Unggalál	Ningnglát
LOCATIVE—	Yusmásu									Milo	Nimalli	Unggalil	Ningngalil

* Generally pronounced *Ninde*.

Art. III.—*Memoir on the Geology of the South-East Coast of Arabia.* By H. J. Carter, Esq., Bombay Medical Service, formerly Surgeon of the H. C. Surveying Brig "Palinurus."

Presented October 1851.

The matter contained in this "Memoir" was chiefly collected during the late Surveys of the South-east Coast of Arabia, by Captain Sanders* and Lieut. Grieve, I. N.; much has been contributed by Lieut. Grieve, who latterly had sole charge of the Survey, through specimens and information of parts which I had not an opportunity of examining; and the geology of the Curiyah Muriyah Islands is extracted from the late Dr. Hulton's interesting account of them, taken during the time they were surveyed by Capt. Haines, I. N., now Political Agent at Aden.

Previous to entering on the subject of this "Memoir," I shall premise a few general remarks on the outline of the coasts about to come before us more in detail: this will be followed by a running geological description of them, made more particular where they were actually examined; and, finally, a short review of all the facts which have been brought forward.

Although I have only mentioned the South-east Coast of Arabia, I shall begin from the Straits of the Persian Gulf, follow the South-eastern Coast and its islands to the Straits of Bāb el Mandeb, and then, crossing over to Berbera, pursue the African Coast from this point, with its islands, to Socotra. I have not much to offer of the former or latter coasts, but what little I have will, I think, be found interesting, in connection with the South-east Coast of Arabia.

Beginning, then, from Ras Mässändäm, which is the name of the western promontory of the Straits of the Persian Gulf: the mountains which form this have been fretted into innumerable irregularities, and rapidly rise from 400 feet, which is the height of the small island called Mässändäm, at the extremity of the Cape, to 2000, then 3000, and

* It is but due to state, to the memory of this able surveyor and excellent officer, who died at sea near Malta on the 14th August last, that I received the greatest kindness from him during the time I had the good fortune to be under his command.

subsequently, as they progress in a semi-circular direction, south-eastward, to 6000 feet above the level of the sea, which they are at a point some miles inland opposite Măskat; leaving in their course a comparatively flat country between their lower hills and the sea, which is called Bātănă. This flat country extends to within fourteen miles of Măskat, after which the land, which is raised up into a confusion of ridges and hills, with scarped precipices, presents an irregular sea-cliff on to the neighbourhood of the Devil's Gap; and inland a succession of elevations, which end in the ridge just mentioned. This ridge, which is about forty miles from the sea opposite Măskat, is, as before stated, about 6000 feet high, and goes by the name of Jibal Făllah. Proceeding southwards, it gradually approaches the coast, and terminates at the Devil's Gap, of which it forms the northern boundary: it is there 6228 feet high.* The Devil's Gap is the outlet of a great valley, which ramifies up among the mountains of Oman. From its southern boundary another ridge arises, which attains a height of 4400 feet† within eight miles of the sea, and descends to the latter in two or three precipitous cliffs. This ridge is continued on south-eastwards, to terminate in Jibal Jallān, which is about 3900 feet high,‡ and about twenty miles inland from the south-eastern coast: it is the southern extremity of the great mountainous chain of Eastern Arabia. From its eastern side a group of mountains extend towards Ras el Hăd, or the eastern extremity of Arabia, to which we shall come presently, and its subsidence in the other directions will be mentioned by-and-bye.

The eastern extremity of Arabia, commonly called Ras el Hăd, is truncated, and presents a coast facing due east, about twenty miles in extent. This is accompanied by a sea-cliff about one hundred feet high, which is about the general level of the land here.

Turning this extremity to the south-west, we get no more sea-cliff for a great distance, and after passing opposite the termination of the great chain to which I have alluded, the land soon subsides to a general level of from 50 to 100 feet above that of the sea, without any mountains interiorly, or towards the south-west, but presenting a continuity of low undulating hills, of a sandy-looking aspect, and a light brown colour, as far as the eye can reach. This continues on to opposite the island of Masira, where the mainland sinks to the level of the sea, the only place on the coast where this occurs unbacked by mountains.

The island of Masira, which is opposite this port, is rocky and mountainous, and in its highest part not more than 600 feet above the level of the sea.

* Chart; Lieut. Grieve. † Idem. ‡ Idem.

After Masira, the mainland begins to rise again, and a sea-cliff first commences at a Cape called Ras Kăbret, in 19° 57′ N. lat. and 57° 48′ E. long. The land, however, on the western side of the bay, called Ghobat Hăshish, which is a little to the north of Ras Kăbret, is 80 feet above the sea,* and goes on increasing in height, until it attains an altitude of 480 feet† at Ras Markās, which is close to Ras Jăzirăh. On account of the coast here running north and south for 100 miles, and therefore cutting its general direction, which is N. E. and S. W., at an angle of 45°, we not only see that the land rises towards the S. W., but that it rises also towards the south.

From Ras Jăzirăh onwards, the coast gradually increases in height to 800 feet, which it is about the centre of Curiyah Muriyah Bay; and in its first part is, from its height and whiteness, very similar to the cliffs between the North Foreland and Beachy Head. But as we approach the south-western horn of Curiyah Muriyah Bay, its outline and horizontality become disturbed, and suddenly it attains a height of 4000 feet, which it preserves, more or less, on to the Yaffai mountains, at the Straits of Bāb el Mandeb.

Opposite Curiyah Muriyah Bay are five small islands, which in point of size are hardly more than the tops of so many mountains. They are about twenty miles off shore, and the largest and highest, which is Hăllăniyah, has a point 1645 feet above the level of the sea. There are also two or three still smaller opposite Hisn Ghorab, about sixty miles south-west of Makalla.

The chief features of the land between Curiyah Muriyah Bay and the Straits of Bāb el Mandeb are, that here and there it is more or less tabular in its outline; more or less broken into mountainous peaks; more or less interrupted by ravines; five times by great valleys; and once (in the Bay of El Kămmăr) by an intervening tract of low land forty to fifty miles in breadth, which, running S. W. and N. E., seems to cause a natural division into two parts of the mountainous ridges of which this elevated tract is composed. Throughout, this high land is more or less scarped upon the sea or the maritime plain, which latter is seldom more than ten miles in breadth.

Its color is for the most part white, particularly where it is weather-worn, and here and there black or brown, where it is confronted by, or mixed with, rocks of an igneous origin.

Having thus given a brief outline of a part of the North-east and the South-east Coasts of Arabia, let us now proceed to the composition of their rocks.

* Lieut. Grieve. † Idem.

Returning to Ras Mässändàm, which, as before stated, is the western promontory of the Straits of the Persian Gulf, and the northern extremity of the chain of mountains which extends along the North-eastern Coast of Arabia from the Cape just mentioned to the neighbourhood of Ras el Häd, we find this promontory, taken generally, to be mountainous, and fretted out into innumerable irregularities, which have given rise to the formation of as many coves, creeks, inlets, islands, islets, and rocks. Ras Mässändäm, the extremity of an island by the same name, is 400 feet high, and the next portion of the Cape is about 1500 feet, and but a few miles further inland these mountains rise to 3000 feet. At first sight they no doubt appear like black basalt, from their color, and hence have been described as such by Captains Wellsted and Whitelock, and have always been considered igneous rocks. Pliny calls them the Eblætian mountains, probably from the Arabic *iblis*, the devil; but latterly this promontory and its islands have been inspected by Lieut. Constable, of the Indian Navy, who has kindly shown me rock specimens from them, which prove that they are all composed, not of black basalt, as before suspected, but of jet black and dark black grey limestone, interstratified and veined with white and pinkish brown calc-spar. The jet black limestone is of a fine compact structure, and breaks with a smooth conchoidal fracture, like lithographic limestone, but the lighter colored varieties are more coarse, and break with a rough fracture. The calc-spar, which is in strata of eight to ten feet thick, is columnar, or vertical, in its crystallization, and traversed horizontally by wavy lines, like that from Gibraltar: some of it is of a dazzling whiteness, and of a massive saccharoid crystalline structure. I was informed by Lieut. Constable that the whole of these mountains here are of a similar composition, and that they are horizontally stratified, the strata in some places being thinner and more schistose than in others.

Proceeding southwards, this chain of mountains, as I have already stated, curves inland, and leaves a low country in front of it, called Bätänä, which is without sea-cliff, on to a point fourteen miles north of Mäskat. It is from this point that my own observations commence. To the north of it, as far as the eye can reach from an elevation of 600 feet, nothing is seen but a low shore, shelving up very gradually to the mountains inland, each shelf presenting a scarped surface, possessing a chalky appearance, which gives a general whiteness to the whole district, and from which I inferred that it was but a continuation of the same limestone formation as that of the sea-cliff on which I was standing when I made these remarks.

This limestone formation, as it occurs in the vicinity of Mäskat, I

have already described in our Journal;* but for the sake of not breaking the continuity of the present description, I will repeat a paragraph or two of it here, leaving the reader to go to the paper itself for further information on the subject, which it would be as well that he should do at once, if possible, as he will there find, in the geological description of the neighbourhood of Máskat, an account of the limestone formation in this locality, and a description of the different igneous rocks which have come to the earth's surface in this part of Arabia, all more or less typical of what we shall hereafter frequently meet with on the south-eastern coast.

In summing up the few observations contained in the paper to which I have alluded, it is stated, p. 125,

"That the limestone formation, limiting the group of igneous rocks at Máskat, both north and south, commences (from below upwards) with a deposit of the same kind of pebbles (viz. coarse and fine-grained diorites, basalts, petrosilex and quartzites), lying in both places on the fundamental rock of the locality; passing into a sandy grit; then into a silico-calcareous deposit; then presenting the remains of marine animals, (small ostreiform Gryphæa,) these increasing in number with the calcareous material (chiefly consisting of minute and small Foraminifera); the increasing purity of the limestone, interrupted in each instance by a pink-colored deposit, that at Ras Ghissa (south of Máskat) chiefly consisting of the remains of small Foraminifera, and that of the formation at Darzit (north of Máskat) of a thin series of gypseous, marly, and arenaceous strata; then a compact yellowish or fawn-colored limestone (presenting a variety of shells and corals), terminating the series at both places, and almost entirely composed of the accumulated remains of polythalamous animals."

The following are the fossils which I found in this formation, and which I shall insert here, as they are not mentioned in the paper to which I have referred:—

FORAMINIFERA.

Nummularia.— *N. obtusa.* Sow. (Pl. xxiv. fig. 14, Grant's Geol. Cutch. Geol. Trans. Vol. VI. 4to.) *Loc.* Máskat. *Obs.*—The specimen containing these nummulites was brought to me by the late Capt. Newbold, who saw a bed of them in the limestone formation at Máskat. I cannot say from what part of the series it came, but the fact is sufficient to prove that this formation, if not the whole, is a part of the "Nummulitic Series."

* Vol. III. No. xiii. p. 118.

Operculina, d'Orb.— *Species?* Test white, porcellanic, sub-circular, equilateral. The largest about $\frac{1}{16}$ inch in diameter. Consisting of three whorls, each whorl thickened on the external edge; spire irregular, chambers numerous, increasing regularly from a central cell projecting on both sides; the divisions of the chambers distinct externally. *Loc.* Măskat. *Obs.*—This species abounds in the silico-calcareous sandy part of the formation of Măskat, just before the latter passes into compact limestone. It is now, even, common on the South-east Coast of Arabia, and exists in a large bed, mixed with fine sand, in twenty-five fathoms of water, opposite the village of Takah. Other fossilized species of Operculina occur with it at Măskat, even so low down as the grit where the first organic remains begin to appear.

ECHINODERMATA.

Spatangus.— *Species?* Subovate. Length $1\frac{6}{7}$ inch, breadth $1\frac{3}{7}$ inch, thickness $\frac{9}{14}$ inch. Notched anteriorly, truncated and overhanging posteriorly, with the vent in the upper part, from which a ridge extends on to the genital pores. Ambulacra four, sunk in grooves, slightly truncated, the two posterior shorter than the two anterior ones. Base sub-carinated in the centre, mouth bilabiate, near the margin. *Loc.* Măskat. *Obs.*—From the pink stratum which abounds with the Operculina above mentioned.

ZOOPHYTA.

Caryophillia.— *C. cornigera?* Lam. *Loc.* Măskat. *Obs.*—This species is very like *C. Anthophyllum*, (Lam. et Ellis, Tab. 29,) but has rounded extremities and contracted stellæ at the ends of them.

Agarica, Meandrina, Astrea, and Scyphia (Goldf.).

CONCHIFERA.

Gryphæa.— *Species?* (Cast of lower valve, imperfect.) Length $1\frac{6}{7}$ inch, breadth $1\frac{3}{7}$ inch. Deeply carinated; irregular, wavy, or lobed towards the circumference, and expanded, particularly towards the right side. *Loc.* Lower sandy part of aqueous strata, Măskat.

——— 2d *Species?* (Lower valve, incomplete.) Length $1\frac{3}{7}$ inch, breadth $\frac{5}{8}$ inch. Deeply carinated, expanded, plane towards the circumference; smooth externally, presenting concentric striæ; uncinated, like *O. Uncinata* Desh. (Coq. For. Envir. de Paris, Tome 1, Tab. 18, Figs. 7—11.) *Loc.* Măskat. *Obs.*—This and the foregoing species abound together, and are more or less ostreiform.

GASTEROPODA.

Natica.— *Species?* (Cast, incomplete.) About 2 inches long. First and second whorls depressed. *Loc.* Măskat. *Obs.*—Imbedded in a

yellow calcareous stratum, or granular deposit, consisting of minute Foraminifera.

The limestone forming the upper part of this formation, north of Măskat, is much more pure and compact than any that I arrived at in tracing the strata from below upwards on the south side of this town; and, from the distance of the top of the formation from the fundamental rock in the former situation being much greater than in the latter, I am inclined to think that the section I took on the south side of Măskat was incomplete, and that the upper compact strata had there disappeared.

From the sandy nature of the deposits in which the small Foraminifera abound in this formation, and the sandy base of the genuine specimen of nummulitic rock which the late Captain Newbold found at Măskat, as well as from the loose silico-calcareous or calcareous sand in which all the nummulites I have ever seen, from Egypt, Sindh, and Cutch, have been imbedded, I am of opinion that this is the part of the Nummulitic Series in which their remains are to be sought, and not so much in the compact and purer limestone above, where I had always fancied they were to be found; and when, in connection with this, I consider that the bed of Operculina already mentioned, opposite Takah, which contains the largest living specimens of Foraminifera I have met with, is mixed with fine sand, and that I have always observed their tests to be more numerous in sandy bottoms than in more subtle and plastic deposits, I am not so surprised that these delicate shells should not occur in the finer material of which the compact limestone of the Nummulitic Series is more or less composed, and where I had expected most to find them.

Passing on from the commencement of the sea-cliff at the end of the plain of Bātăṇă, to the town of Măskat, we soon step from the limestone formation, here all at once raised to 600 feet above the sea, on to the bed of igneous rocks, in the midst of which Măskat is situated.

These are spread over an area of about ten miles long, and three miles broad, and are chiefly composed of serpentine, which is limited on the coast, and inland by a yellow-colored limestone formation, (the one just mentioned). Their ridges and summits are sharp and peaked, and seldom exceed 400 feet in height, and their sides and valleys soilless and barren.

"The serpentine is for the most part of a dark brown colour, and interspersed with small laminated crystals of diallage *chatoyante*. When taken from a depth, it is tough, and not easily broken; but on

the surface crumbles and breaks into rectangular fragments, the sides of which are more or less coated with green and variegated serpentine, steatite, or calcareous spar. In some parts it is of a light brown color, and earthy, while in others it is darker, more compact, and more waxy or crystalline. It is exactly the same as that of the Lizard Point, in Cornwall."

Here I must correct a misapplication of terms; the "serpentine," following Brongniart's "Classification et Caractères Minéralogiques des Roches,"* should have been termed "euphotide." It presents the same varieties as that of St. Kevern, and the Lizard, in Cornwall, viz. Euphotide felspathique, and E. ophiteux (Bt.), that is, a rock composed of compact felspar, with isolated crystals of diallage, more or less serpentiniferous, just as diorite (Bt.), with which we shall presently see it is connected, is composed of two ingredients, viz. felspar and hornblende.

The northern extremity of these igneous rocks is composed of diorite, and the limestone formation rests upon it, while between the diorite and the euphotide is a bed of green steatitic clay, out of which oil jars, water jars, &c. are manufactured.

Passing over these igneous rocks to the limestone cape called Ras Ghissa, which limits them to the south of Mäskat, we follow the coast from this point on to the cape called Ras el Hăd, at the eastern extremity of Arabia, and of this part I know nothing further than what I have frequently seen from the sea, and what Lieut. Grieve, who surveyed it, has kindly communicated to me.

From Ras Ghissa the limestone formation is continued on for thirty or more miles in an extremely broken condition, being raised in ridges one after another, having their white fractured surfaces towards the north-east, and their original surfaces sloping in the opposite direction; consequently the sea-cliff which faces them is also extremely irregular. After the distance mentioned, the formation loses its ridge-like character, and passes into round and isolated hills, and the great inland ridge approaches the sea to form the northern boundary of the Devil's Gap, which, as before stated, is 6223 feet above its level. There is here a break, and no cliff for a few miles, until the ridge, which forms the opposite or southern boundary of the opening of the valley, commences, and this, attaining a height of 4400 feet not above eight miles from the sea, presents, as may be conceived, an immense mural surface in this direction.

From the summit of the ridge here, which is called Jibal Jābăr, the

* See Dict. des Sciences Naturelles, Art. "Roches."

land descends to the sea in two or three gigantic cliffs, and is thus scarped the whole way to the town of Soor, where the coast line, turning still more to the east, leaves the scarped ridge to pursue its course southwards, and terminate in the mountains of Jallān. Lieut. Grieve states (Priv. MS.) that "the Jibal Beni Jābăr rise abruptly from the sea to a height of about 3000 feet," near a deep narrow valley called Wadi Shāb, about thirty miles N. W. by W. of Ras el Hăd. Specimens from this valley show that this mountainous ridge is composed of limestone, like that of the other parts of the coast. Its scarped bared surface presents a horizontal stratification, and a general light brick-red color, which is the prevailing tint of the limestone formation throughout the whole coast of Southern Arabia, and arises from the presence of more or less red argillaceous earth, which is found in the cavities of the rock, and about the organic remains. When the rock weathers down to these cavities, the earth becomes liberated, and, spreading over the white limestone, gives it the tint mentioned. In some parts it has entered into the composition of the rock itself, which then is of a cream color. Opposite the scarped surface of Jibal Jābăr there are no soundings half a mile off shore, and this is invariably the case on this and the south-eastern coast, where the land rises abruptly from the sea. Wherever it is highest the soundings are deepest, and *vice versâ*.

From the town of Soor to Ras el Hăd, the coast presents a sea-cliff of about 70 feet high, with land rising in shore to 200 feet, but sinking gradually towards the eastward to the level of the sea, which it attains at Ras el Hăd; also several great irregularities along the coast, which have evidently been occasioned by subterraneous influence.

Lieutenant Grieve mentions a singular pit on the top of the cliffs two miles east of Soor, which is 80 yards in diameter, and 60 feet deep; and it is only a few months since that an earthquake took place near Soor, which shook down several houses there. After this pit, come two other similar, but much more extensive depressions, viz. the Khors or Lagoons of Jărāmah and Hăjar. The former, entering by a narrow channel from the sea, is three miles long and two broad, with sides of 50 to 70 feet high, and water ten fathoms deep, making in all a depth of 110 to 130 feet below the level of the surrounding land. Khor Hăjar, which follows this, is not more than half the size, and much more shallow, but of the same kind of depression.

Rock-specimens from the top of the cliffs about two miles from Soor, near the great pit, which were kindly sent me by Lieutenant Grieve, show that they are composed of a fine white saccharoid limestone, which

has undergone minute fracture, and has had its fissures filled up again by a red colored cement, probably of the same composition as the parent rock. Such a brecciated state is frequently seen on the south-eastern coast, and in all probability has been caused by the shock of some subterraneous explosion or upheaval. At the same time, I have noticed that such rocks are more or less magnesian: the one just mentioned, on a rough analysis, yields about 12.18 per cent. of magnesia, and hardly effervesces at all with acids before it is pulverized. Its Sp. Gr. is 2.72. The specimens from the lower strata of the same cliffs show that they have not been fractured in the same manner, though of the same composition and structure. I think I have also noticed on this coast that the upper strata are those which are most comminutely fractured, while the lower ones are less so, or have escaped it altogether.

The rock-specimens from the sides of Khor Jărāmah are of a coarser structure; and when we arrive at Khor Hăjar, where the cliffs sink to the level of the sea, and are lost under the sand of the plain, there we find them composed of a limestone conglomerate, consisting of pebbles of the older formations, and shells, cemented together by a red calcareous sand, in which there are minute particles of igneous rocks. In some parts, this cement exists as a rock by itself, without the grosser portions, and appears to belong to a loose miliolitic formation, which we shall find by-and-bye to prevail on the south-eastern coast.

At Ras el Hăd, which is a sandy cape, we have a plain of two or three miles square, connected on its western side with the Khor last mentioned, and on its eastern side forming the northern point of that short piece of coast which, running north and south for twenty miles, terminates the eastern extremity of Arabia. This short eastern face presents a uniform limestone cliff 100 feet high, and of a light yellowish color, with horizontal strata. Specimens from it show that it is composed above of a compact yellow limestone, breaking with a sub-conchoidal, uneven fracture, almost identical with that from the cliffs of Kurachi opposite; also of strata of the same kind of material and structure, containing abundance of small Foraminifera; and a stratum of whitish saccharoid limestone, like that mentioned at the base of the cliffs two miles east of Soor; while another specimen from these cliffs shows that there is a stratum of the kind last alluded to, which contains a considerable quantity of hyaline quartz, in minute grains, indeed an arenaceous limestone; it resembles the fine silico-calcareous strata of the limestone formation at Măskat.

Turning Ras el Khubba, which is the south point of this short piece of coast, we come upon the South-east Coast of Arabia, and lose all sea-

cliff for upwards of 180 miles. The coast now generally runs N. E. and S. W., and presents nothing but a sandy shore for the distance I have mentioned, and which I will now more particularly describe.

The first thing worthy of notice on proceeding along this coast is a little cape called Ras Rues, which consists of a few hillocks about twelve feet high; this is about three miles from Ras el Khubba. These hillocks are composed of a recent conglomerate, the grosser parts of which are held together by a dirty-looking silico-calcareous sea-sand, and though exceedingly insignificant in appearance, nevertheless they are interesting in a geological point of view, inasmuch as they contain pebbles of all the rocks probably in the neighbourhood. These pebbles consist of diorites, basalt, quartzite, jasper, and portions of the older limestone formation, all smoothly rounded by attrition.

After leaving this cape, and passing along the coast, we arrive opposite the mountains of Jallān, which I have already stated to be the termination southward of the great chain on this side of Arabia. They are about twenty miles inland from the south-east coast, and the highest is about 3900 feet above the sea. On every side, viz. towards Ras el Hād on the east, and the desert of Akhāf on the west, as well as towards the south-eastern coast, they, like other mountainous terminations, subside more or less gradually, and more or less irregularly, to the general level of the surrounding country. This, towards Ras el Hād, or the eastern extremity of Arabia, is in coin-shaped mountains, which offer beautiful scarps for the geologist, and are easy of access; towards the south, in low conical or dome-shaped hills of a brown sandy aspect, mixed with dark peaks, probably of igneous matter, such as we shall see a little further on; while towards the west the subsidence is more gradual and regular, to hills of about 200 feet high. Mr. Cole, of the Indian Navy, who travelled from Laskhara, a town on the coast just here, to Māskat, along the western side of these mountains, kindly sent me specimens from the hills near Bādiyah, which town is in the same parallel of latitude as the highest of the Jallān mountains. These specimens show that the same kind of black limestone exists there as that which Lieut. Constable showed me from Ras Māssandām; also pieces of fine compact grey lithographic limestone; and of fine argillaceous slate, of blue and black colors. Hence we may infer that the black limestone forms part of the mountains of Oman, both north and south, but whether continuous or isolated remains for future observation to determine.

Some distance after the subsidence of the mountainous chain has taken place towards the eastern extremity of Arabia, and the land in

this direction has assumed a general level of from one to two hundred feet above the sea, two mountains, close together, and of equal height, being about 855 feet above the plain, make their appearance. These, which are called Jibal Săffăn, are close to the cliff of the eastern extremity of Arabia, and of course isolated for some distance from any other mountains. They are, therefore, very remarkable, from their situation, and being coin-shaped, presenting their fractured surfaces towards the west; they also form a fine section, which is easily attainable, so far as it goes, of the strata at this point; the sea-cliff, as I have before stated, being only 100 feet high.

From Ras Rues onward we have no cliff, and nothing on the land remarkable, beyond the low, brown, sandy-looking hills, and isolated dark peaks, dispersed here and there among them, until we arrive at a place called Ras Jibsh, which only differs from the rest of the coast in presenting a few of these dark peaks, which are arranged in a ridge-like form about 100 feet high, made more evident by their being a little above the surrounding country. There are now no longer any mountains to be seen inland, and nothing more than a monotonous extent of brown sandy-looking mounds, from 50 to 100 feet above the level of the sea, as far as the eye can reach in every direction.

The dark igneous peaks which form the cape called Ras Jibsh are probably only a repetition of what we have before seen among the sandy hills, and they are composed of euphotide and diorite, as those at Măskat. The diorite, however, presents larger crystals of hornblende, which occurs here in a diversity of forms: sometimes it seems replaced by the diallage of the dark euphotide, or by bronzite or hypersthene; while the felspar sometimes passes into labradorite, of a blueish grey color, and presenting minute parallel lines or striæ, which traverse the plane of cleavage. One part of this ridge is composed of a very marked rock, consisting of moderately-sized crystals of black hornblende and grey felspar, in equal proportions, among which is disseminated a small quantity of a beautiful grass-green hornblende: it is not improbable that the black hornblende itself is but a deeper tint of this color.

There is also, close to these igneous rocks, but much lower than the tops of them, a mound of dull red jasper, undergoing fragmental disintegration: this is probably a chertified condition of some aqueous strata, which have been brought up with the igneous rocks.

The immediate neighbourhood consists of the hills I have mentioned, probably limestone, more or less obscured by drift-sand.

Inside the ridge of rocks is a small bay, which now only offers a safe landing for boats, but which is said to have formerly extended a long

way further inland behind the ridge mentioned, where there still exists a dry lagoonal depression, about two miles square, and 12 feet above the level of the sea. There is also, on the inner side of the ridge, a modern deposit, the upper margin of which is between 20 and 30 feet above the level of the sea. I have already mentioned one at Ras el Hăd, which is raised at least 12 feet above the level of the sea, also a littoral conglomerate at Ras Rues, the upper part of which is about 12 feet above the sea; and here we have a similar deposit, raised 30 feet above it. This kind of formation we shall find frequently on this coast.

From Ras Jibsh south-westwards, the coast presents a still more desolate aspect, if possible, than it did to the eastward of this cape: not a dark mound now appears to vary the color of the land, close to the sea, or as far as the eye can reach interiorly; but as we approach Ras Abu Ashrin, which is in 20° 58′ N. lat., and 58° 44′ E. long., the light brown color of the land ceases, and is succeeded by a tract of white dome-shaped sand-hills, from one to two hundred feet above the level of the sea. These extend inland as far as the eye can reach, and are scarped upon the sea, where their structure is satisfactorily seen. None of these scarps, which correspond to the hills forming part of the line of coast, are I think more than a hundred feet high. The formation consists of a sandy, granular rock, which, when minutely examined, is found to be chiefly composed of calcareous grains, with a small quantity of hyaline quartz, and dark particles, probably hornblende, from the igneous rocks. The latter character is deserving of notice, because, as no dark particles of this kind appear in the older limestone, they serve as a distinguishing mark for this formation when it approaches the latter in appearance. So uniform is it in its granular structure that there is hardly a fossil larger than the grains of which it is composed to be seen throughout the whole deposit. It is more or less stratified, and, though loose in structure, is sufficiently compact to form a good building stone. The thickness of this formation cannot be further ascertained than that which can be learnt from its scarped parts, which at the utmost do not exceed 100 feet. It is so loose on the surface that the upper and exposed part has become disintegrated for some depth, and, assisted by irregular upheavals, the original formation has probably thus been transformed into the dome-shaped mounds which it now presents. In some parts the sand is so subtle that it yields to the lightest weight, while in others it is so caked that it will bear that of a man. At a little distance it has the appearance of mounds of snow. Can these be the "winding sands" which are alluded to in the Khoran

among which the tribe of Ad are said to have perished? There can be no doubt that they form the south-eastern part of the Desert of Akhāf, and not far from the borders of it where this tribe is said to have settled; and could the gulf of sand at the western extremity of this desert, in which Baron Wrede found a plummet sink to the length of the line attached to it, viz. 360 feet, be the disintegrated sand of this formation, filling some volcanic depression there? There is no doubt that this deposit forms the lowest part of the seaward boundary of the Desert of Akhāf, and it may do so throughout; and that the desert itself extends at first a little inland, and then to the westward, to within 300 miles of the Red Sea, and about 150 miles from the south-eastern coast, where the "Sand-gulf" mentioned is said to be situated. The desert itself is also said to be impassable, and nothing would render it more so than an extension of such sand-hills as those in the neighbourhood of Ras Abu Ashrin.

When subjected to a chemico-microscopic analysis, if it may be so termed, the calcareous particles of which this deposit is composed are found to be nothing more than the remains of minute Foraminifera, the tests of which, having become partially dissolved and re-crystallized, have cemented the whole together; but this having taken place without interfering with the form of their internal cavities, and the latter being filled with the mineral called by Dr. Mantell moluskite (yellow silicate of iron?) allows of the latter being dissolved out by a weak acid, and the origin of the calcareous grains thus ascertained: not only this, but the extreme faithfulness with which the internal cavities are represented admits also of their species being determined.

I have been thus particular in describing this deposit, because we shall find it so widely spread along this coast; and not only here, but extending to the peninsula called Khattyawar, on the coast of India, from whence it is imported into Bombay in considerable quantity, for building and flooring stone; and supplies much the same place that the freestone from Portland does on the southern coast of England. I shall henceforth apply the terms miliolite or miliolitic to this deposit.

At Ras Abu Ashrin the coast sinks nearly to the level of the sea, and continues so for thirty-nine miles, or on to the bay called Ghobat Hāshish, where the same kind of white sand-hills are again met with. I do not think this flat portion extends very far inland before it is stopped by the tract of sand-hills mentioned: indeed I could see that it does not, from the high land of Masira opposite; nevertheless it is the lowest part of the South-eastern Coast of Arabia, unbacked by mountains; and the island of Masira, to which we will now pass over, lies opposite it, about ten miles distant.

Masira is thirty-five miles long, and varies from four to nine broad, and a chain of mountains runs longitudinally through it, which sends off spurs to the principal capes. This chain is chiefly composed of igneous rocks, and its highest mountain, which is in the northern half of the island, is not more than 600 feet above the level of the sea; while hardly any in the southern half of the island exceed 300 feet. Here and there tracts of limestone present themselves, but these are of small extent, and chiefly raised up upon peaks of the igneous rocks. Besides the main chain, which through its spurs and ramifications extends nearly all over the island, leaving only here and there, on its inner side, some sandy plains, there are other small ridges and rocks, which run more or less round the margin of the island, and others in the southern part of the channel, between Masira and the main land, which make their appearance in reefs and small rocky islets.

To the igneous rocks and the limestone there may be added a modern formation, composed of sea-sand, in which are imbedded shells, corals, and pieces of the older rocks. Let us now turn our attention to a more particular description of these formations.

The igneous rocks are chiefly composed of euphotide and diorite, such as we have before seen at Ras Jibsh and Mäskat, but, in addition to these, there are more or less homogeneous green and black diorites, also basaltic rocks, more or less scoriaceous, or cellular, and amygdaloidal trap, the cavities of which are filled with calc-spar.

The euphotide is seen as usual in conjunction with its companion the diorite, though not, I think, so plentiful. They form the main chain and principal masses in the island. This, which is the older diorite, contains large crystals of hornblende, as at Jibsh, but of a greater variety of colors, such as green, brown, deep dark red, and black, sometimes in equal quantity with the compact felspar, at others preponderating. At the northern extremity of the island, the diorite is of a newer kind, and from its fine structure, homogeneous appearance, and black color, almost resembles basalt: it is here 200 feet above the level of the sea; it forms the islets, too, and is seen in many parts, but as a less plentiful rock. The fine green diorites, and the trap, also form low round hills, of considerable extent, and the cellular and phonolitic basalt much higher hills, with loose portions on their sides, the whole weathering smooth, and of a dark red brown color.

The accessory minerals which I met with were epidote, with calc-spar, and micaceous iron ore, tremolite, hornblende of different colors, and diallage, with its varieties, also copper. The latter mineral exists in many parts of the island, chiefly, I think, among the fine-grained

green earthy diorites, and low trap hills. I found it in the form of malachite, disseminated and in veins, in the parent rock, and following veins of hyaline quartz which traversed it. In many parts it has been worked, as the excavations and remains of slags and smelting-places in various parts indicate, but the weather-worn state of those I saw would make the time at which they were worked very remote. I have given a short account of these copper veins in this Journal (Vol. II. No ix. p. 400).

From the igneous rocks, let us go to the tracts of limestone. These are of small extent, and for the most part raised on the tops of the older igneous rocks. Beginning at the northernmost end of the island, we find a tract commencing just inside the group of black dioritic rocks which forms this extremity, and from thence extending longitudinally along it for about five miles, making the central ridge or highest elevation of this narrow part of the island. It is scarped towards the west, and slopes into the sand of the sea shore on the eastern side, at the same time that it rises towards the south-west, so that the dip of its strata is towards the east, and that of its strike north-east. For a long way the ridge or upper line of the scarp is not more than 30 or 40 feet above the level of the sea, but at its southern extremity it rises suddenly to about 100 feet. Here it presents a trifid rent, giving rise to three great fissures, which run in different directions towards the sea on each side of the island, respectively. The thickness of the scarps here is from 60 to 80 feet, and their geological section is as follows:—

The upper part of compact limestone, of a whitish yellow colour, cleavable, but breaking with a rough fracture. This is more or less filled with the remains of shells and corals, and extends downwards for 40 feet. It then passes into ten feet of coarse, loose, sandy, silico-calcareous limestone, of a yellow colour, containing numerous shells, and then 10 feet more of the same deposit, traversed by veins of gypsum, after which follows a coarse arenaceous yellow limestone, more or less shelly, which is lost beneath the bottom of the fissure.

Returning to the inner shore of the island, by one of these fissures, I passed, after issuing from it, between the scarp of the limestone ridge on my right hand and the igneous rocks of the island on my left, while the part over which I walked was composed of loose gritty earth of bright red and yellow colours, which seemed to be the finer parts of a jaspidean conglomerate that lay beneath. This conglomerate I thought might be an altered and lower deposit of the limestone formation, which would then make the section of it correspond with that at Mäskat.

The pebbles of this conglomerate have been so changed by the heat to which they have been exposed, that it is impossible to say what they were originally. In it, also, are disseminated here and there small quantities of malachite, which is the case in the silicious conglomerate of the limestone formation that rests upon the diorite at the village of Darzit, north of Máskat.

The second tract of limestone we come to, proceeding south-westward, is raised on the top of the main chain of dioritic rocks, in the centre of the northern half of the island. Its surface, which is horizontal, is 400 feet above the level of the sea, and its form very conspicuous from a distance, on account of its horizontality, and the contrast of its light yellow colour with the dark rocks around and beneath it. This tract is of an irregular shape, and about two miles long, by a quarter of a mile broad, and its longest diameter is parallel with the longitudinal axis of the island. The southern extremity of its upper surface or plateau, which is attenuated, and not more than 50 feet wide, is undermined on each side for upwards of 15 feet, which leaves only a support of about 20 feet wide in the centre; other parts on this side of the plateau are similarly worn, while there is nothing of the kind on the other sides. This leads one to infer that these excavations were effected by the waves when this limestone tract might have been rising from the sea. The fact also of their being only on the south-western extremity strengthens this, from the north-eastern part being sheltered by the coast, and the opposite side being directly exposed to the south-west monsoon. The surface of this plateau, which is perfectly horizontal, and the strata of the whole mass parallel to it, is bestrewed with the casts of bivalve shells (Conchacea) in the same manner as the hills about Hydrabad in Sindh, and among these, the casts of large species of the genus *Lucina* are by far the most prevalent in both localities. The following is a geological section of this tract:—

Beginning from above downwards, we have a compact limestone, of a whitish colour, cleavable, and breaking with a rough fracture: this is more or less filled with shells and microscopic Foraminifera, and extends downwards for 100 feet. Then follows a coarse yellow limestone, more or less sandy, which chiefly presents the remains of corals, and occupies about 50 feet; after which comes about 50 feet of loose yellow silico-calcareous sand, and red and green arenaceous clays: the upper two-thirds, consisting of the former, are traversed by veins of gypsum, in all its common crystalline forms; and the latter, consisting of the clays mentioned, forms the base of the series, and rests upon the diorite. I did not perceive a conglomerate here to bear out my inference respect-

ing its existence at the base of the last tract, which is not exposed. The only fossils obtained were the following:—

Corbula ?— *Species ?* (Cast.) Trigonal, inequilateral, inequivalve. Breadth $4\frac{1}{4}$ inches, height $3\frac{1}{2}$ inches, depth $1\frac{4}{7}$ inches. Thick posteriorly; compressed anteriorly. *Loc.* Masira, from the surface of the plateau.

Spondylus.— *Species ?* (Cast.) Subovate, inequilateral. Breadth $1\frac{4}{7}$ inch, height $1\frac{1}{2}$ inch, and depth $\frac{9}{14}$ inch. Striæ numerous, close together, and thin, the largest bearing small spines. *Loc.* Masira, from the second tract of limestone.

Although I could perceive traces of numberless fossils in this limestone, the only ones that I saw weathered out were the bivales on the plateau, and the one last mentioned.

Adjoining this tract of limestone are two others, which are only separated from it by a deep ravine: they are a little less in size, and slope towards the east with the tops of the igneous rocks on which they are supported. I had not time to visit them.

The next tract I shall describe is by far the most interesting of all, on account of its fossils. Proceeding south-westwards, we come to this about two miles from the plateau. But it is not similarly situated as to height, for its base is barely raised above the level of the sea, from which it is about a mile inland, among the igneous rocks. Like the southwest extremity of the first tract, this has also been raised by a force applied from below, here in the centre of the mass, which has produced a radiated fracture of the whole, and thrown its parts widely asunder, so as to expose a floor beneath, now half a mile or more in diameter. This floor happens to consist of a stratum of small nummulites, which reveals the nature of the limestone tracts hitherto examined, and establishes the existence of the Nummulitic Series on this part of the South-eastern Coast of Arabia.

The limestone, which rises about 100 feet above this floor, is of the same kind as that already described, and the fossils obtained from the inclosed area, which presents a vast variety, are as follows:—

FORAMINIFERA.

Nummulina.— 1st *Species ?* Circular, slightly convex on both sides, thin at the edge. Breadth $\frac{2}{7}$ inch, thickness $\frac{1}{7}$ inch. Horizontal or wavy; surfaces smooth, sloping gradually towards the circumference; presenting when polished a reticulated structure. Splits into halves, and shows a spire, consisting of a great number of whorls, which are divided into small chambers; the whole becoming more dense towards the centre. *Loc.* Masira.

Nummulina.— 2nd *Species?*. Orbicular, doubly convex; Breadth $\frac{1}{12}$ inch, and thickness $\frac{2}{12}$ inch. Surfaces smooth, sloping suddenly to a thin circumference; presenting a reticulated structure, like the foregoing species. Splits in halves horizontally, and exposes a spire, consisting of a great number of whorls, divided into small chambers, the whole structure becoming more dense towards the centre. *Loc.* Masira. *Obs.*—The entire stratum was nearly made up of this and the foregoing species.

ECHINODERMATA.

Spatangus.— 1st *Species?* Conical. Length 6½ inches, breadth 5½ inches, and height 5 inches. Ambulacra four, not depressed, spreading from the centre of the summit of the test, and extending nearly to the margin; grooved anteriorly in the place of the fifth ambulacrum. Genital pores four. Mouth bilabiate, between the centre and anterior extremity. Base oval; carinated in the centre, from the mouth backwards, and covered with small tubercles; bordered on each side by a longitudinal area of smooth polygonal plates. Vent terminal supra marginal. *Loc.* Masira. *Obs.*—The remains of this large fossil were very numerous, and partly filled with the nummulites mentioned.

——— 2nd *Species?* (Incomplete.) Length 2 inches, breadth 1½ inch. Ambulacra five, petaloid, situated in deep furrows, spreading from a point nearer the anal than the oral extremity; the posterior two shortest. *Loc.* Masira.

Cidaris.— *Species?* (A portion only of the test, bearing two big tubercles.) The largest $\frac{7}{12}$ inch in diameter at the base, surrounded by a ring of small tubercles, but none within the circle. *Loc.* Masira.

CRUSTACEA.

Cancer.— *Species?* Carapace sub-elliptical; Diameter 5¼ inches transversely, 4 inches antero-posteriorly. Spiniferous laterally; spines five in number, alternately bifid, extending from the orbits backwards; orbits 2¼ inches apart. Pinchers large, expanded, equal in size, concave on the interior surface, and bordered on the posterior edge by eight tubercles; tail consisting of six segments. *Loc.* Masira.

CONCHIFERA.

Tubicola.— *Species?* (See a description of the tube among the fossils from Hammar el Nafur, further on.) *Obs.*—They abound among the nummulites in Masira, and are very common in Sindh.

The deposit in which these fossils were imbedded bears little trace of them when not weather-worn or disintegrated, so that this might partly account for my having passed them over in the other limestone tracts. Here they abounded all ready to my hand, but being alone

when I fell in with them, and the sun having set, I could not examine the place so much as I wished, nor bring away so many fossils as I desired, and the next day we removed to a station several miles distant; so that I had not an opportunity of returning to this really garden of fossils, much to my regret.

The last unmentioned tract of limestone in this island is that which forms two mountains 500 feet high, at its south-western extremity. It is a narrow portion, about a mile long, and raised, as usual, on peaks of the diorite. There were no loose fossils about it, and the character of the limestone I have already described. Its base is buried in the debris of the superincumbent mass.

All these tracts are doubtless parts of the same limestone formation, which was once continuous over the island of Masira, but has since been broken up by the eruption of its igneous rocks, and more or less carried away by the action of the waves, during the time that the island has been gradually rising from the bottom of the sea to its present position. The presence of the bed of nummulites, too, in one portion of it, shows also that the whole belong to the Nummulitic Series.

Having now described the two principal formations in the island of Masira, viz. igneous and aqueous, let us turn our attention for a few minutes, before returning to the main land again, to the more modern formations to which I have alluded. These are two in number, one of which, perhaps the latest of the two, is seen in the north-eastern part of the island, where it is about 12 feet thick, and raised about 40 feet above the level of the sea, about a mile from it. It is scarped on its seaward side, and runs parallel to the north-eastern extremity of the island, which is truncated, and on the other side thins off upon the rocks on which it is supported. It is composed of shells, and pieces of coral, from which the animal matter has disappeared, and portions more or less rounded of the limestone and igneous rocks of the locality, all of which are slightly held together by sea-sand, consisting of minute grains of the same kind of material. It lies between the two groups of igneous rocks which form the two angles of this truncated extremity of the island, and is firmly adherent to their sides.

The other formation, which is but a finer deposit of the last mentioned, and perhaps a little older, is considerably elevated above the sea. It may be seen close to the village of Gyren, on the inner side of the south-western half of the island. It only differs from the miliolite of the opposite coast in containing more particles from the igneous rocks, and is raised on the top of some greenstone peaks, about 200 feet above the level of the sea.

Before concluding my remarks on Masira, I should mention that in the north-east half of the island, a little inland of Ras Jazirāh, there is a small low mound of aqueous strata, projecting from the plain of igneous rocks which exists there. These strata, which have been rendered jaspidean by heat, are in a vertical position, and composed of an extremely fine flinty material of a red or flesh colour, probably originally a fine clay. They are undergoing fragmental disintegration, and the pieces very much resemble leelite. To what formation this belongs I cannot say, but probably not to the limestone formation of Masira, for that rests on the igneous rocks in which this appears to be enveloped. I have mentioned the existence of a similar mound, and similarly situated, at Ras Jibsh.

Returning to the main land, to the bay called Ghobat Hashish, which is opposite the south-western extremity of Masira, and to which we have already brought on the low land behind this island, and the sand-hills from Ras Abu Ashrin, we find the compact limestone again appearing from beneath the miliolite. This is seen on the western side of the bay, where it is about 80 feet high, after which it rises gradually on to Ras Jazirāh, about 100 miles distant, where it is about 480 feet above the level of the sea; and the direction of this part of the coast, being due south, as I have before stated, shows also that the strata gradually rise in this direction, as well as to the south-west, which we shall see presently.

For the specimens and information I possess of this part of the coast I am indebted to the kindness of Lieut. Grieve, who surveyed it in 1847.

Rock-specimens from the west side of the bay of Hashish, and from Ras Sārāb, about twenty-five miles south of it, show that the limestone formation which here emerges from beneath the sand-hills, consists of a fine compact rock, some of which is magnesian, heavy, and of a grey color.

Next comes the little island called Hammar el Nafur, which is about twenty-five miles south of Ras Sārāb, and of all the information which Lieut. Grieve has communicated to me, that from this little island and another cape next to it, called Ras Kariat, with their specimens, are by far the most interesting and important. It is extremely fortunate that this little island should exist just here, at the commencement of the rise of the cliff, which we shall find by-and-bye carried up 4000 feet above the level of the sea far beyond our reach; for from its form and position, together with the cape mentioned, we obtain an unmistakeable geological section of the cliff for 320 feet down from its summit, which is the height of Hammar el Nafur.

This island is about 400 yards long, by 300 broad, and its summit, though flat, is split in all directions. Rock-specimens from it show that it is composed of compact white limestone, and concretionary flints above, the former breaking with a more or less smooth fracture. This is stated to extend down 150 feet, and to present no loose fossils. Then comes 50 feet of white earthy or gritty calcareous deposit, more or less mixed with argillaceous matter, of a greenish white color, in which there are many fossils; and the rest is stated to be greenish white clay, without any; the bottom of the sea everywhere in the neighbourhood being composed of the latter material.

This clay, just stated to be of a greenish-white colour, is meagre to the touch when dry; breaks with an irregular rough fracture; receives a polish when scraped with the nail; does not adhere to the tongue; does not effervesce with acids; does not mix readily with water, but, when once rubbed up with it, remains for many days suspended in it, in an impalpable powder. Before the blow-pipe it dries up, becomes red and porous, and then passes into a black slag. When in combination with more or less calcareous material, it forms an excellent soap.

Having described this clay, I will now add a list of the fossils which Lieutenant Grieve sent me, and with them include those which came from Ras Kariat, nearly opposite, since the strata and fossils of both places are said to be exactly the same, and the specimens confirm this. They are as follows:—

FORAMINIFERA.

Nummulina.— *Species?* Circular, compressed, terminating at the circumference in a thin edge. Breadth $\frac{2}{17}$ inch, thickness $\frac{1}{31}$ inch; surfaces smooth, without any marking; presenting a spire internally, with many whorls, divided into small chambers. *Loc.* Hammar el Nafur and Ras Kariat, in the gritty calcareous deposit below the compact limestone.

Orbilolites?— (Impressions only). 1st *Species?* Oval. Length $\frac{6}{17}$ inch, breadth $\frac{5}{17}$ inch.—2nd *Species?* Circular. Diameter $\frac{3}{17}$ inch. *Loc. idem. Obs.*—Found in the marl passing from the gritty calcareous deposit into the clay.

ECHINODERMATA.

Echinocyamus.— *E. pyriformis* Ag. mihi. (Tab. 22, figs. 19—24, et *Echinoneus placenta* Goldf. Tab. 42, fig. 12.) Sub-pentagonal. Oval. Length $\frac{1}{14}$ inch, breadth $\frac{1}{17}$, height $\frac{3}{17}$. Subtruncated anteriorly, pointed posteriorly; mouth central; vent inferior, and situated a little distance from the margin. *Loc. idem.*

Echinocyamus.— *E. siculus* Ag. mihi. Oval, depressed. Length $\frac{5}{12}$ inch, breadth $\frac{7}{12}$ inch, height $\frac{2}{12}$ inch. Mouth and vent the same as in the foregoing species; ambulacra five, petaloid, not depressed. *Loc.* Hammar el Nafur and Ras Kariat. *Obs.*—This, and the foregoing species, are numerous in the earthy deposit below the compact limestone, together with the nummulites, which, on the other hand, are scanty, judging from the specimens of the deposit sent to me, but they are probably more numerous in other parts.

Clypeaster.— *Species?* Sub-pentagonal. Length $2\frac{8}{12}$ inches, breadth $2\frac{3}{12}$ inches, height $1\frac{4}{12}$ inch. Summit sub-central, anterior; ambulacra five, petaloid, in furrows, each enclosing a raised area; genital pores four; none posteriorly, mouth sub-central, depressed, surrounded by five tubercles, or projections, with a groove between each, presenting ambulacral pores; vent sub-marginal. *Loc.* Ras Kariat.

CONCHIFERA.

Tubicola.— *Species?* Tube only. Circular. Diameter $\frac{1}{2}$ to 1 inch; slightly increasing downwards. Straight or slightly crooked; sometimes bent at an obtuse angle; length unknown. Wall of tube from the thinness of a wafer to $\frac{1}{12}$ inch; composed of concentric layers, smooth and round internally; uneven, and presenting transverse striæ or rugæ externally. Filled with the material in which they are imbedded. *Loc.* Hammar el Nafur, Ras Kariat, Masira.

Teredo Navalis.— *Species?* Tube, sub-circular. Diameter above $\frac{1}{4}$ inch, increasing slightly downwards to a point, where it suddenly dilates; sub-flexuous; length of specimen $2\frac{1}{2}$ inches, real length unknown. Divided internally above by a transverse septum, which ends below where the tube dilates, (probably close to the animal,) in the two compartments becoming separate syphons, which are in contact in the middle, and entirely separated from the rest of the tube. Wall of tube $\frac{1}{12}$ inch thick; external surface uneven; irregular; striæ arranged longitudinally, and becoming circular where the tube suddenly expands. *Loc.* Hammar el Nafur and Ras Kariat. *Obs.*—The first of these tubes abounds in the earthy limestone or marly deposit with the nummulites, both here and in the island of Masira. They are also very common in Sindh. A specimen of one is figured in Pl. xxi. fig. 1 of Grant's Geology of Cutch, (loc. cit.) where it has been provisionally called "*Serpula? recta*" by Mr. Sowerby.

CONCHACEA.

Lucina.— *Species?* (Cast, imperfect.) Circular, compressed, equivalve, presenting little tubercles in circular depressions on both sides, which

appear to be impressions of the mantle. Breadth about 2 $\frac{8}{10}$ inches, and length 2 $\frac{3}{10}$ inches. *Loc.* Hammar el Nafur. *Obs.*—This is a fac-simile of one of the species of Lucina found commonly about the hills at Hydrabad in Sindh, and like those on the surface of the plateau in Masira. It is a characteristic fossil of the upper part of this series, from which therefore it most probably came in the island of Hammar el Nafur.

GASTEROPODA.

Natica.— *Species?* (Cast, imperfect.) Breadth 4½ inches, and length 3½ inches. *Loc.* Hammar el Nafur and Ras Kariat. *Obs.*—There are several imperfect casts of large Naticæ from the softer limestone of these localities. In Sindh, also, such casts are found, composed almost entirely of large nummulites, together with minute and small Foraminifera. They, therefore, in the absence of the larger nummulites, here serve to establish the nature of the deposit in which they are found; throughout which the shells of Conchifera and Gasteropoda would seem to have entirely disappeared, as in most other parts of the Nummulitic Series with which I am acquainted.

Before proceeding further, it is worth while to compare the strata of the island of Hammar el Nafur and Ras Kariat, on the main land, with a section of the nummulitic strata forming the range of hills at Sukkur, in Sindh. This section was kindly sent me by Dr. Malcolmson, of the Bombay Medical Service, who states in his letter as follows:—"I have been over the Sukkur range of hills to their termination at Daji Kot. There is but little diversity in the whole range, which in no place exceeds 400 feet in height. The whole is one mass of nummulitic limestone, more or less disintegrating. It is, however, strange that the upper strata are in many places *very compact, and contain but few fossils, but are very plentifully interspersed with flints;* some of the flints contained large nummulites. The escarpment of the whole range faces the west. The strata are perfectly horizontal. Some of the limestone is of a cream colour, and forms a good building stone, which wears well, and does not seem to suffer from atmospheric exposure. About twelve miles from Sukkur I found a bed of clay *underlying* the nummulitic limestone, filled with the impressions *only* of shells. [This clay, of which Dr. Malcolmson sent me a specimen, is of the same kind as that at Hammar el Nafur.] The hill is here 250 feet high, and composed entirely, in the lower part, of nummulites, overlaid by compact limestone, containing flints. I traced the out-cropping of the clay for about half a mile."

Here, then, we have nearly the same strata as at the island of Hammar el Nafur and Ras Kariat, and that too about the same height, viz. 400 feet, composed of *compact limestone* above, then *nummulites* in a *loose disintegrating (gritty ?)* deposit below, and afterwards *clay*.

It is important to establish the exact nature of this series at Hammar el Nafur and Ras Kariat, for the reasons I have before stated, viz. that as the cliff rises towards the south-west we shall soon find these strata elevated beyond our reach, so that when we come to the height of 4000 feet we shall have to assume that they still form the summit there, from their existence at Hammar el Nafur and Ras Kariat; unless we can prove this by the presence of the nummulites themselves, or some other allied fossil. The disintegration of the deposit in which the great mass of nummulites are imbedded I have generally observed to be the case in all the specimens I have seen from Egypt, Sindh, and Cutch. I have not yet seen a compact hard limestone charged with nummulites.

Passing back to the coast opposite the island of Hammar el Nafur, Lieut. Grieve states this to be "low, and to present a range of small dark peaks, rising gradually from the beach." These are probably the tops of low igneous rocks, which we might expect to be near, from the break in the cliff, and the upheaval of Hammar el Nafur opposite it.

The next place from which I have specimens is Ras Kariat, already mentioned. This cape is nine miles south of the island of Hammar el Nafur, and about forty north of Ras Jazirah. From this point the cliff, which is 280 feet high, and has hitherto been in detatched portions, is extended on continuously to within a few miles of Ras Jazirah. The upper part of it, like that of Hammar el Nafur, is composed of compact white limestone with concretionary flints, passing below into an earthy gritty one, thence into a marly deposit, and lastly clay. The fossils are the same as those of Hammar el Nafur, and have been described under the list from that island. I received also large portions of radiated and columnar crystallized carbonate of lime, pointed at the circumference, translucent, and of a greenish white colour; they are crossed by transparent wavy lines, as if they had been formed by successive additions, and appear to come from the earthy limestone near the green clay; also specimens of gypsum, of which some of the tubes of the Tubicolæ were made up. The occurrence of gypsum here should not be forgotten, for it exists in the same position at Masira and Maskat, viz. below the compact limestone.

From Ras Kariat the cliff, as before stated, extends on uninterruptedly to within a few miles of Ras Jazirah, or a little beyond Ras Markas, which is nine miles from the former cape, where they are 480

feet above the level of the sea. Rock-specimens from this show that the base is composed of a pinkish, compact, sub-saccharoid, magnesian limestone, which slowly effervesces with acids; also a rock of the same kind, but filled with the cavities of small shells, viz. Cardium and Cerithium, containing selenite. The Cardium is oblique, inequilateral. Length $\frac{1}{8}$ inch, and breadth $\frac{3}{32}$ inch. We shall find a rock almost identical with this occurring at Makalla, about 600 miles S. W. of it; the proximity, however, of igneous rocks, which we shall find in both localities, have probably influenced this resemblance, more than the continuity of the stratum.

Lastly, we come to Ras Jazirâh, the end of this portion of the coast, which now suddenly returns, from running N. and S., to its general direction, viz. N. E. and S. W.; and here we have another eruption of igneous rocks. This is confined to the cape, and its immediate neighbourhood, but it presents as complete a picture of such a disturbance as can well be witnessed. The continuity of the cliff, which on either side is uniform, and horizontal as far as the eye can reach, is here entirely broken up by the igneous rocks, and the detached portions of its strata thrown into all kinds of positions, and weathered into all kinds of shapes; while the dark rock appears between or below them, or in separate peaks, among the general wreck. Where the white strata overlie the igneous rock, they are discoloured for some distance, red and black: this would seem to be the passage into the former, just as we saw it in the base of the plateau at Masira, where these coloured strata are composed of red and dark green clays; for the limestone here probably rests on dioritic rocks, as at Masira, and the rupture has been caused probably by their subsequent elevation, and by the effusion, perhaps about the same time, of more igneous matter. Specimens from the island which joins the cape at low water, and from which it takes its name, show that it is formed of a rock belonging to the euphotide and diorite before mentioned, and of which probably the igneous rocks on shore are principally composed. These specimens consist of brown compact felspar, in which there is an equal quantity of sparkling laminated black hornblende, in small crystals; and on the plane surfaces of the specimens an ophiolitic or nephritic deposit, like that seen about the euphotide hitherto met with. On either side of this eruption the cliffs, as before stated, are continuous, and their strata horizontal, as far as the eye can reach, but their whiteness, which hitherto has made them look so much like those on the south-east coast of England, seems here to cease, and to give place to a light yellow tint.

From Ras Jazirâh the cliff is continued on, with the exception of a

break here and there, (where it falls back and gives place to a sandy plain in front,) to Ras Shaherbataht, and Ras Gharau, which capes are within a few miles of each other. Here the cliff is 800 feet above the level of the sea, and has been gradually rising to this since leaving Ras Jazirāh, a distance of 110 miles. Capt. Haines states that the upper strata here are composed of limestone, below which come "chalk" and flints.* As we approach this cape, we observe that the cliffs begin to present large caverns, which appear to have been solely excavated by the waves; they are very similar to those seen on the Bill of Portland. I could not help thinking that in this way most of the great caverns which we shall by-and-bye see in the mountains have been formed, and which now serve for the habitations of most of the Bedouins who live on the high land of Southern Arabia. At Ras Shaherbataht the same kind of uniformity and continuity of cliff meets the eye on either side, as at Ras Jazirāh, only that it is nearly twice the height; but as we approach the centre of Kuriyah Muriyah Bay a totally different aspect presents itself: here we observe at Ras Shuamiyah, which is about 135 miles from Ras Jazirāh, another and much more extended outbreak of igneous rocks than at the latter point. The cape called Ras Shuamiyah is formed by a dark black-looking igneous rock, and on either side of it black dykes irregularly extend up through the white strata, in some places raising them and running along between them, and in others attaining the summit and flowing along the surface above the cliff, the uniformity of which may well be conceived to have become totally destroyed by this eruption. In some parts it is raised higher than we have hitherto seen it, in others more depressed, while the land interiorly appears to have participated in this, if not in a former more general disturbance; and a few miles further south-west, its irregularities still increasing, brings us to the high land before mentioned, which is 4000 feet above the level of the sea, with the white cliff we have been passing at the upper part of it. This is the eastern limit of the elevated tract of Southern Arabia, and the western limit, on the coast, of the low land or Desert of Akhāf. The south-western part of Kuriyah Muriyah Bay is bordered by the former, which, breaking down towards the extremity of the horn, ends in a granite mountain, 1200 feet high, which forms the cape itself, and is called Ras Nus.

The appearance of this granite mountain probably explains the grand and sudden upheaval of the coast here. It is the first granite we have met with, but we shall soon find that we have come to an immense tract of it, which not only extends along the coast south-westward for several miles,

* Journal Royal Geograph. Soc., Vol. XV.

but also eastwards, where it forms the greater part of the Kuriyah Muriyah islands, to which we will now direct our attention.

They are five in number, neither of which is more than twenty-five miles from the coast; and the farthest apart are not more than thirty-five miles from each other, while they are all in the same parallel of latitude. The largest, called Hăllăniyah, is about seven and a half miles long, and about three and a half broad. The next in size is Soda, which is about three miles long, and two broad. Haski and Jibliyah are each about a mile square, and Gharzaut is hardly more than a large rock.

Hăllăniyah is composed of about one-sixth limestone, and the rest of igneous rocks. The limestone occupies the northern part, and forms a cape 1645 feet above the level of the sea; its colour generally is a light yellow to the water's edge, and its strata, though tilted up and displaced where they are in contact with the igneous rocks, are undisturbed at the cape, any further than is caused by their elevation of about fifteen degrees towards the north. The late Dr. Hulton, from whose description of these islands* the following remarks have been extracted, states:—

"About the centre of the island [Hăllăniyah] the hills rise into a cluster of pointed spires, the highest of which was computed by trigonometrical measurement at 1510 feet above the level of the sea; and from these, similar hills run in all directions, preserving in most cases the form of interrupted ridges. At the eastern [northern ?] extreme, the land assumes a different state; a perpendicular headland, 1645 feet in height, boldly projects into the ocean, and for some distance to the westward appears a continued mass of table-land, accidentally heaved up, as it were, at the end of the island. With the exception of this high land the rest of the island is chiefly composed of granite, varying somewhat in its structure, and the proportion of its fundamental ingredients, upon which also depends a variety in its colours. The most interesting feature of the granite is the manner in which most of its ridges are surmounted by a dark-coloured rock, allied in its characters to those of the trap order, more especially to greenstone. [The latter is our diorite, and the dark-coloured rock probably euphotide, which we have before seen to accompany it.] This is found passing through the body of the hills in the form of dykes. The same rock is seen abundantly in the form of veins and seams, traversing the granite in all directions. It would appear as though by some powerful internal impulse this substance had been injected into fissures in the granite, produced by the same violent action. To a person viewing it

* Trans. Bombay Geograph. Soc. 1839-40, p. 189.

from a moderate distance, the distribution gives rise to an appearance of an unusually dark shade running along the summits of the hills, as most of our party at first fancied. These dykes and seams do not follow any general rule in regard to their direction, but are entirely influenced in this respect by the disposition of the granite, which follows no particular course. They vary from a fine vein of a few inches to a stratum of eighteen or twenty feet in breadth. In mineral composition, too, they differ no less materially. Most of it I have stated to resemble greenstone, in the compactness and simplicity of its structure, and hornblende appears to be the predominant ingredient; but by the intermixture of felspar in greater or less quantity, rocks of a very different nature result, still occupying the same relative situation. In some places the felspar is disseminated in the form of distinct crystals, communicating a porphyritic structure; in others quartz is abundantly intermingled, giving it more of a granitic aspect. In the latter there is a tendency in the compound to diffuse itself more extensively through the granite bed, losing its character as a stratum, and entering largely into the formation of the hill itself. In fact, it appears to undergo, by this accession of felspar and quartz, a regular transition to granite itself, and merely differs, as far as the eye can judge, in colour, which, from the presence of hornblende as a subordinate mineral, becomes of a dark speckled hue. . . . . In both this and the prevailing kind of granite, mica, if not altogether wanting, is a very scarce ingredient, and is found chiefly in the light-coloured veins of granite intersecting the granite mountains." There can be no doubt, I think, that this is an altered state of the euphotide already described: the author knew greenstone (diorite); he also knew granite, and trap; and there is no other "dark coloured rock," that I saw, in this part of Arabia, "allied" to greenstone, but "euphotide."*

"The eastern end [northern ?] of the island is that which attains the highest point of elevation, and is composed of a secondary limestone pretty regularly stratified towards the sea. It contains in its substance a few fossil shells, but is not remarkable for anything further than its proximity to the granite, its greater elevation above the sea, and its

* In my "Geological Observations on the Igneous Rocks of Maskat, &c.," (see this Jl. Vol. III. No. xiii. p. 128,) I have stated that Dr. Hulton had not mentioned either euphotide or diorite in his account of the Kuriyah Muriyah Islands, nor did I see any of these rocks at Marbat. But I had not then begun to put together this paper, and therefore had neither read Dr. Hulton's account, nor looked over my specimens from Marbat, with such attention as I have done since, which will account for any discrepancies that may appear in this and the paper alluded to regarding the rocks of these two localities.

insulated situation. It is nowhere intersected by veins of either granite or greenstone."

I know nothing myself more of this island than that which I have stated previous to quoting Dr. Hulton's description, and have nothing to remark further respecting it than that I would direct attention to the depth of the limestone strata here, which we shall find useful by-and-bye in determining its real depth throughout the neighbouring coast.

The small rocky island of Gharzaut, which is a little N. N. E. of Hăllăniyah, and 200 feet high, is composed "exclusively of granite of a reddish colour, and a fine crystalline structure."

Soda, which is six miles west of Hăllăniyah, presents a peak 1310 feet above the level of the sea. The composition of the hills is granitic, with the same distribution of dark-coloured strata as that noticed on Hăllăniyah, though not quite so conspicuous. "The granite on the eastern end, and on the central part, is of a dark grey colour, with extensive veins of a light colour, traversing it in various directions. That on the western end is a mixture of red and grey granite, in varying proportions, the red preponderating in most localities, and of a fine texture, similar to that of Rodondo [Gharzaut]."

The geological structure of Jibliyah, the highest point of which is about 500 feet, is stated to be "essentially primitive, but with a greater variety in the appearance of the rocks than we found at Hăllăniyah. The outer detached rocks are of similar composition, being formed of a species of dark-coloured granite, in which hornblende appears to enter largely. The island itself is composed of porphyritic syenite, the colours of some specimens affording a rich and diversified appearance."

Haski, the most western of all these islands, and the nearest the shore, presents in its highest peaks an altitude of about 400 feet. "In its geological characters, too, it is nearly similar [to Jibliyah], though the reddish-coloured granite, which is common in Soda, is here found to constitute the greater portion of the island, the remainder being composed of a species of variegated granite and porphyry."

Thus we see that these islands are, with the exception of Hăllăniyah, all composed of igneous rocks, and that, too, chiefly of granite; and we also see that they are all nearly in the same parallel of latitude as the village of Hasek, which is only nine miles north of Ras Nus, the south-western extremity of Kuriyah Muriyah Bay, and which itself, as before stated, is also formed of a granite mountain. Further, if we look at Captain Haines's beautiful chart of Kuriyah Muriyah Bay, we shall not find a sounding of 50 fathoms north of this little chain of islands

and a line extending from them to Hasek, that is between them and the main land to the north, while immediately south of them and this line the soundings sink to 145 fathoms, and no bottom, showing that there is a great depression on this side, which we also learn by the soundings to be continued westward to Ras Nus, and along the coast as far as Marbat, where the granitic tract ends.

Returning again to the shore, we find ourselves opposite a very different coast to that we have just passed: one now of 4000 feet instead of 800 feet above the level of the sea; and commencing from Ras Nus, where we left off, which is the seaward point of demarcation between the low and high land, we find the granitic tract on shore to commence here, (though at sea it begins much farther eastwards, as we have seen in the Kuriyah Muriyah islands,) and to extend on to Ras Marbat, a distance of forty miles, where it ends. At first it is narrow, and runs along the base of the broken-down table-land, but the latter, soon falling back, gives place to an expansion of it into a low field of igneous rocks, which is about ten miles wide, and terminates at the cape mentioned. This field, which is backed by the precipitous declivity of the table-land, presents an almost uninterrupted uniformity in its lowness, except at one point, near the sea, where an isolated pyramidal mountain of the main land remains, as a type of what once existed over the whole area. This mountain or pyramid, called Jibal Jinjări, which is 1300 feet high, is stated by Captain Haines to present chalk and gypsum in its composition; and so far it is interesting, because we know that these two substances exist in a fixed part of the upper strata of the white limestone series, from what we have seen at the island of Hammar el Nafur and Ras Kariat, where it is only 320 feet above the level of the sea, and from their presence in similar situations in other parts. By chalk here is meant a soft white earthy limestone, or gritty calcareous deposit; there is no genuine chalk on this coast that I have met with, though the former is a close approach to it, and, in the absence of the latter for comparison, might easily pass for chalk.

In the immediate vicinity of Ras Nus the limestone strata, capping the detached and broken-down masses of the table-land, (which in this way here reaches the sea,) are much and variously inclined, while a similar disturbance is evinced by the older igneous rocks of the low plain which follows, from the variety of coloured dykes with which they are veined. I explored about a dozen square miles of these rocks near Marbat, and also ascended the precipice of the table-land at this point, the particulars of which will now occupy our attention.

The igneous rocks, as before stated, terminate at Ras Marbat in a low plain, which shelters a little bay and village of the same name on its inner side, that is between it and the main land. This plain is about four miles square, and 30 feet above the level of the sea in its centre, from which it gradually slopes on all its free sides to the sea. It is more or less wavy, and here and there interrupted in its continuity by irregular fissures running to the sea, and by projections a few feet above the surface of the granite rocks of which it is composed, while at the bottom of the bay is a group of granite hills, about 100 feet high.

The igneous rocks of this plain and its neighbourhood consist of red and grey granite, red protogine granite with black hornblende sparcely mixed with the chlorite, syenite, euphotide, and coarse and fine-grained diorites, green chlorite brecciated with fine compact brown limestone, and cemented together with calcareous matter; to these may be added gneiss, which appears in vertical strata in the midst of the groups of red and grey granite rocks projecting from the plain.

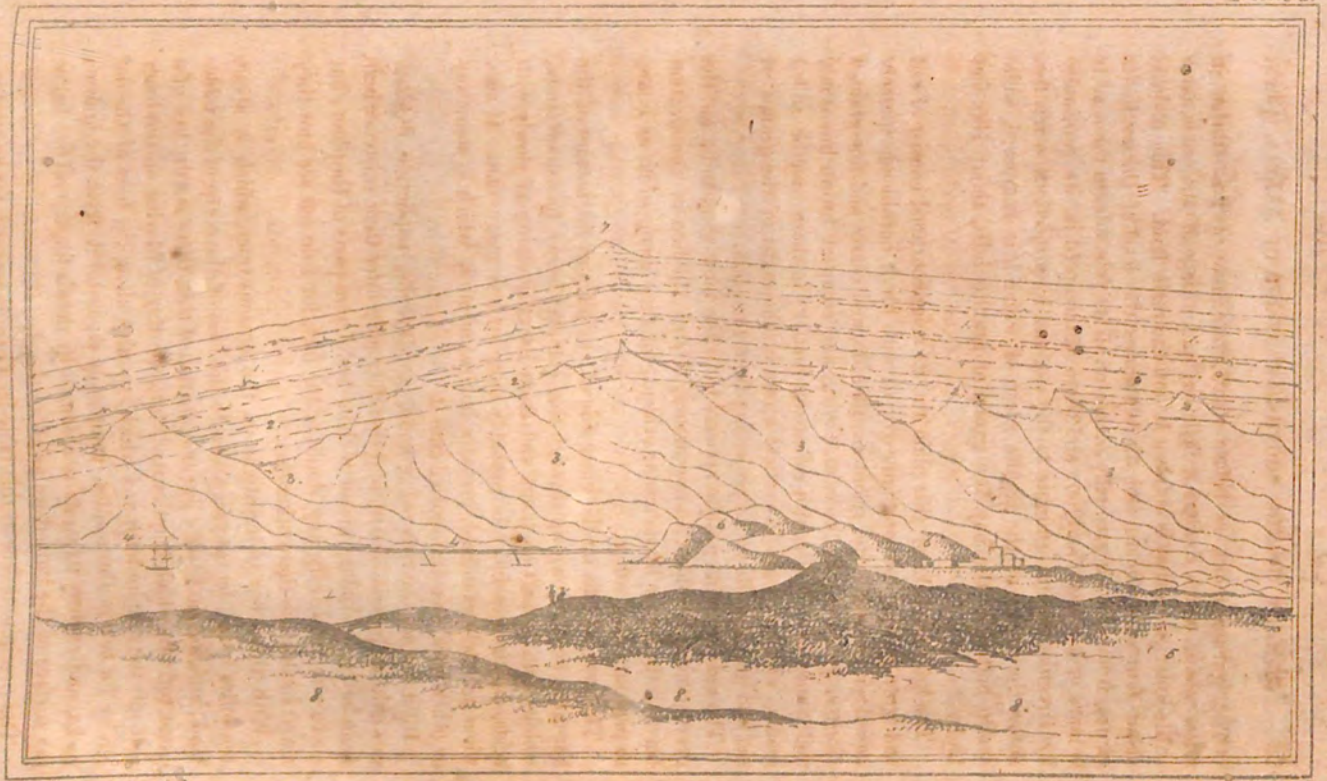
The red protogine granite appears to be the most abundant; and the grey granite the oldest in appearance, though the line of demarcation between the two is by no means evident, for they seem, so far as I saw, to pass into each other.

The granite hills on the inner side of the plain at the bottom of the bay have been thrown up through fine compact brown limestone strata, which forms a part of them, and from its effervescing so slowly with acids, and its heaviness, is probably more or less magnesian. It also, when minutely examined, presents laminæ of mica, which in some way or other have been transported into it.

I did not see the rich red granite, grey syenite, euphotide, diorites, nor chlorite breccia *in situ*, and therefore only infer their existence here from having picked up pieces of them in different parts of the plain; but there can be hardly any doubt of the fact, for I do not see how they could have come there otherwise.

With these few observations on the igneous tract, which is about ten miles broad, let us pass across to the base of the scarp of the table-land; and, fortunately for our examination of this, there is a dry bed of a great torrent, which empties itself into the Bay of Marbat on the inner side of the granite hills, and which, running along the base of the declivity for two or three miles, completely separates it from the igneous rocks, and exposes its strata unobscured by debris for several feet below the surface of the immediate neighbourhood.

The precipitous face of this table-land here is scarped for about two-



J.G. Constable. del.

MARBAT.

H.I.C. lith.

1. White Limestone Series.
2. Argillaceous Series.
3. Micaceous Sandstone.
4. Dark Brown Limestone.
5. Millolitic Deposit.
6. Granite Hills.

7. Marbat Peak 3400 ft. 8. Granite Plain.

fifths of the way down, and then slopes outwards in ridges, like great buttresses, which, parting from the base of the escarpment, in pointed extremities, expand out to a great extent as they reach the plain below. Commencing, then, from the base of these opposite Marbat, where the escarpment is 3400 feet high, and where the torrent bed before mentioned is 20 feet deep, we have from below upwards the following geological section, viz., coarse micaceous sandstone, of a yellowish brown color, becoming finer as we ascend, for 1700 feet; then passing into argillaceous strata of a red color, which continue for 300 feet; and lastly into white limestone strata, which form the rest of the series, an extent of 1400 feet.

These divisions I will now describe more in detail, and commencing from below, we find the sandstone of a compact gritty structure, becoming finer as we ascend; massive at first, but becoming thinly laminated, and in the upper part of all thicker again, and jointed; breaking with a rough earthy fracture throughout; of an ochrish brown color, and ferruginous aspect below, becoming more yellow in ascending, and then of a dirt-brown color at the top; presenting mica throughout, but more in some parts than in others, though diminishing generally in quantity towards the upper part.

The dirt-brown colored fine deposit of this sandstone passes into the argillaceous division, which presents strata of various colors, but chiefly red. One, a dark red clay stratum, and of a soapy nature, presented an excavation, which the Bedouins told us was made by their women, who came there occasionally to eat the clay; whether from hunger or a vitiated taste I could not discover, but probably the latter.

These red strata pass into white and grey compact limestone strata, more or less thick, more or less fine in structure, more or less lithographic in appearance, above which comes a whitish yellow chalky deposit, more or less argillaceous, from which the Bedouins cut their pipes, and then a white compact limestone again. The latter lies in heaps of bare rocks, weathered into rude architectural-looking piles, 300 or 400 feet high, and two or three miles inland from the summit of the table-land, as seen from below, so that this much must be added to the 3400 feet, which height was obtained by triangulation from a base measured on Marbat plain, where, from what I have stated, the real summit could of course not be seen. We had no means of obtaining the height of this scarp in any other way.

The soil on the summit of the table-land is of a brick-red color, and more or less argillaceous; it seems to come from the cavities and disintegration of the limestone, which, where it is bare, has been

weathered into sharp undulating ridges, as it is on some parts of the coast, where the sea is washing it away without making any deposit.

The following are the fossils which were obtained from these limestone strata:—

FORAMINIFERA.

Alveolina, (D'Orbigny.)— *Species?* Ovo-spheroidal or melanoid; long diameter $\frac{6}{10}$ inch, short diameter $\frac{4}{10}$ inch. Sulcated longitudinally, in sigmoid lines, which extend from apex to apex, marking the divisions of the chambers, which present transverse parallel striæ, dividing them into compartments. *Loc.* Marbat, from the summit of the formation inland downwards to an unknown extent. *Obs.*—This fossil varies in size below the measurement given. It is a characteristic fossil, and occurs also in great abundance in lower Sindh, near Tatta, where it is well known by the name of "Tomra," and forms the sacred strings of beads worn round the neck by Hindu devotees, and others of that religion. It differs from *Fascicolites* (Parkinson) *elliptica*, Sow. (Grant's Geol. Cutch, pl. xxiv. fig. 17), which on the other hand abounds in the hills of Hydrabad, in being more spheroidal, and exceeds a little in size the largest of those I met with at Marbat.

Operculina, (D'Orbigny.)— *Species?* Discoidal, nautiloid, very thin. Width $\frac{5}{10}$ inch. Surface presenting four whorls, divided into many chambers, which are reflected, and increase regularly from the first to the last cell. *Loc.* White limestone, Marbat. *Obs.*—This little fossil frequently accompanies the foregoing.

Orbitolites.— *Species?* Circular, concave, extremely thin in the centre, abruptly expanding into a thickened rim at the circumference. Breadth 1 inch, thickness at the rim $\frac{1}{17}$ inch. Surfaces smooth, presenting a series of concentric rings, alternately raised and depressed. Internally composed of minute cells, arranged in concentric circles, which are multiplied vertically to four or five tiers deep, as they extend from the centre to the circumference. *Loc.* Marbat. *Obs.*—This fossil, which is not present in the specimens I possess from the summit of the white limestone strata, varies in size below the measurement given. It is a characteristic fossil, and the species and specimens increase in number as we approach the coloured division, where whole strata are composed of them, as we shall see hereafter. The Alveolina and Operculina above described are also found in company with this large Orbitolite. It belongs to d'Orbigny's genus Cyclolina, (Foram. Fos. du Bas. Tert. Vienne, p. 139, Tab. xxi. figs. 22—25,) and its structure has been beautifully figured by Carpenter, (Quart. Jl. Geol. Soc. Vol. VI. pl. vii. fig. 24.) It also occurs in great

abundance in the Hala Mountains, near the Buran River, in Sindh, together with the spheroidal Alveolina called "Tomra" above mentioned, and an Operculina. All three appear to agree with the three as they are found together in Arabia as to size and outward appearance, but the internal structure of the first and last slightly differs. The cells appear larger in the Sindh Orbitolite, and the whorls more numerous in the Sindh Operculina.

Corbis ?— *Species?* (Shell, imperfect.) Breadth $3\frac{9}{10}$ inches, length $3\frac{4}{10}$ inches. Cancellated; resembling *Corbis pectunculus.* (Lamarck et Tab. 13, fig. 3—6 Paris Basin Deshayes.) *Loc.* Marbat. *Obs.*— Found in a small block of fine white compact limestone, with individuals of the foregoing fossils.

Inoceramus?— *Species?* (Specimen imperfect.) Shell thin, suborbicular. Length $2\frac{1}{4}$ inches, breadth 2 inches. Inequilateral, striated concentrically, cardinal edge of upper valve straight. *Loc.* Marbat. *Obs.*—Found in the block of limestone just mentioned.

GASTEROPODA.

Pileolus.— *Species?* (Specimen imperfect.) Shell thin, suborbicular, subspiral, involute, with an ill-defined apex. Length $2\frac{1}{4}$ inches, breadth $1\frac{3}{4}$ inch, and thickness $\frac{3}{4}$ inch. *Loc.* Marbat. *Obs.*—Found together with the foregoing fossils. Species of this genus are very common in Sindh, and almost all that I have seen, which, like the present, are chiefly reduced to their casts, have been more or less filled with *Fascicolites elliptica,* and the spheroidal Alveolina before mentioned. They range from one to four inches long, with a proportionate height, and the border of the columella is denticulated.

Carinaria ?— *Species?* Conical, reflected. Length $1\frac{1}{4}$ inch, breadth at the base $\frac{4}{10}$ inch, slightly compressed laterally, striated horizontally, with a ridge or raphe in front. *Loc.* Marbat. *Obs.*—Found with the foregoing fossils.

Trochus.— *Species?* (Cast, imperfect.) Height about 4 inches, and breadth at the base 4 inches. Spire consisting of nine or ten whorls. *Loc.* Marbat. Found with the foregoing fossils.

Buccinum.— *Species?* (Cast, imperfect.) Length $2\frac{3}{4}$ inches, breadth $1\frac{1}{2}$ inch. *Loc.* Marbat. *Obs.*—Found with the foregoing fossils, which were also accompanied by casts of olives, but too imperfect for description.

From the colored agillaceous strata I obtained nothing but a rock-specimen of limestone of a lead blue color, almost entirely composed of small orbitolites, but I did not preserve it, not knowing at the time from whence it came.

Nor did I see anything in the micaceous sandstone worth noting, except a tesselated arrangement of a stratum in the lower part, over which the path passed, leading from Marbat to the base of the table-land. It is on the short plain here which extends outwards from the base of the latter to the border of the torrent bed, and is raised about 30 feet above the level of the sea. At first I thought this was the tiled surface of a floor belonging to some old building, but a few moments' reflection and observation convinced me that it was the cracked surface of the stratum, which must have been formed at the time of its deposit. The cracks had been an inch wide, and had been filled up with a dark ferruginous sand, which contrasted strongly in color with the white coarse-grained quartziferous sand of the stratum generally, and therefore of those parts which it surrounded. This ferruginous deposit or cement had cracked again in its centre, and so the whole of the divisions had become more or less loose and separable. They are of course of various sizes, and of all kinds of polygonal shapes, and about three inches thick: the ferruginous sand not only coats their sides, but their lower surfaces as well, and it is probably owing to the presence of the iron that this remarkable feature has been preserved. It shows us plainly that this part in particular of the sandstone must have been deposited at the level of the sea, where the tide now and then overflowed it (for no cracking could take place under the sea), and that too before the 4000 feet of strata now above it were deposited; and, as the uppermost stratum of the latter contains the remains of animals which must have been deposited in the sea, these cracks farther show that this portion of the sandstone must have gone down at least 4000 feet since they were formed, and have returned to a position higher than that even in which it was first deposited. I took particular care to ascertain the correctness of this by observations made on the spot, and brought away some of the loosened divisions for closer examination; and the total absence of calcareous material in them, connected with their containing particles of mica, and being of the same composition as the sandstone in which they are found, at once places beyond doubt the possibility of their being a subsequent formation. Neither can these divisions, or the sandstone in which they exist, be confounded with any other above it, because there is no other of the kind; and if it had been a portion of the same sandstone disintegrated and re-deposited, it must have contained more or less particles of carbonate of lime, from the detritus of the older rocks, and the sea in which it was re-deposited; for every formation which has taken place subsequently to, above or alongside this sandstone, does contain more or less calcareous material.

I had not time to examine these sandstone strata much, or probably I might have met with some fossils in them.

Having, then, seen the igneous tract at Marbat, and traced the strata of the table-land to its summit, let us now return for a few moments to the granite plain, where we shall find a modern formation, well worthy of our attention, and which we shall have to trace on for some distance, and indentify with similar ones which we have passed, for it will be some way before we can again get a section of the table-land; and in the mean time we must occupy ourselves with the no less important deposits which lie along its base.

Capping the plain of Marbat, the highest part of which I have before stated is about 30 feet above the level of the sea, is a granular deposit, composed chiefly of particles of carbonate of lime, with which are mixed more or less grains of quartz and hornblende, from the igneous rocks on which it reposes. It is about a yard in thickness, and extends in all directions over the plain to within a mile of the sea. It contains a great number of organic remains, consisting chiefly of casts of small Conchacea. This indeed is the fossil character of the deposit. The houses at Marbat are built with it, and some of the headstones of the graves there are made from slabs of it, which will show that it is of considerable consistence. It fills the inland extremities and crevices of the fissures, which I have stated to extend through this plain to the sea, and there contains very large shells; and adherent to the side of the group of granite hills at the bottom of the bay is a large mass of it, the upper part of which is 30 feet above the level of the sea. Here it presents a vast quantity of corals, with gigantic shells of Hippopus, Ostrea, &c. All these shells have lost their animal matter, and are more or less friable and pulverulent. This formation in its more subtle material closely corresponds with the miliolitic deposit at Ras Abu Ashrin, and when we have proceeded a little onwards from the igneous rocks, we shall find its composition and appearance to be almost identical with it, while at Marbat it more resembles that part of the miliolitic deposit which we have seen resting on the dioritic rocks, near the village of Gyren, in the island of Masira.

Between this formation and the water's edge is a coarser deposit, which overlaps the former, and is composed of rounded gravel from the granite rocks, held together by a whiter matrix than that of the first deposit; and, still nearer the sea, a third, still more white, and apparently more recent, the upper surface of which is about 12 feet above the level of high-water mark.

The fossils obtained from this and the foregoing deposits were:—

Lucina ?— (Cast.) Breadth 1 inch, height 1 inch. *Loc.* Marbat, in the miliolitic deposit lying on the granite plain. *Obs.*—There were many other bivalves present, smaller than this, but none so numerous.

Venus.— *V. puerpera vel corbis* (Lam.) mihi. (Specimen imperfect.) Breadth 3 inches, height 3 inches. Cancellated, the lines projecting a a little at their points of decussation. *Loc.* Marbat, in the deposit between the latter and the water's edge.

Ostrea.— *Species?* Inferior valve oval. Length 8 inches, breadth 5 inches. Deep, patulent; muscular impression sub-central, lateral; straight posteriorly, convex anteriorly. Impression of hinge concave rhomboidal, wavy, terminated by a straight border anteriorly, and by an ill-defined one posteriorly. Margin crenulated for a short distance on each side the hinge; afterwards simple, wavy. Upper valve thin anteriorly, thickened posteriorly, with a deep angular longitudinal groove in the centre. *Loc.* Marbat, from the miliolitic deposit at the end of a fissure in the granite plain.

I should also mention another formation here, which is seen on the inner side of the group of granite hills next the base of the table-land. It forms part of a deposit prior to the miliolitic on the granite plain, and is better seen a little further on, for here it only peeps above the sand close to the sea at the part I have mentioned. It consists of a coarse cellular limestone, in which are sparsely scattered rounded portions of hyaline quartz, and particles of other minerals from the igneous rocks, together with a few remnants of small fossilized shells. Its color, which is of a dark brown, like that of moist brown sugar, as well as its appearance, at once characterizes it among the other deposits, and not less so the extreme craggedness into which it wears by the action of the waves. It is sometimes saccharoid, and generally effervesces slowly with acids.

Having described this rock, let us now proceed along the coast; and, leaving the granite hills of Marbat, we cross the bed of the torrent mentioned to the base of the table-land, following which for four miles over a narrow plain between it and the beach, partly obscured by drift-sand, we at length arrive at an abrupt elevation of this plain to 100 feet above the level of the sea, and presenting a sea-cliff of the same height. This cliff is continued on, broken through here and there by a torrent bed, to the village of Takah, about twelve miles distant. Four miles west of Marbat I examined it, and afterwards a rock, called the island of Guena, which is of the same height, close to it, and the geological section of both, from above downwards, is as follows:—

First, five feet of a granular calcareous sandy deposit, like the

miliolite mentioned, in which are imbedded rounded pebbles of the older limestone. Then a narrow stratum of compact, coarse, shelly, impure limestone, of a light whitish color, resting on a little thicker stratum of dark brown limestone, of the kind stated to exist behind the granite hills at Marbat, which, in its turn again, reposes on a compact white limestone, breaking with a conchoidal fracture, and an even surface. The brown limestone here is more saccharoid in its structure than at Marbat, and contains a little magnesia; in its upper part is sparingly scattered small rounded quartz gravel, from the igneous rocks, and below it presents white spots, which are but large pebbles of compact limestone, from the older formation, now almost indistinguishably blended with it.

When we approach the end of this sea-cliff, which is at Takah, we might expect, as it appears to be all of the same height, to find the same strata again, but instead of this we find a complete absence of them, and in their place an entirely different limestone, which extends to the summit of the cliff. This limestone, which is more or less earthy, and of a white pinkish color, is richly charged with Orbitoides of the following description :—

Orbitoides.— 1st *Species?* Flat, circular, compresed, more or less wavy. Breadth $\frac{8}{12}$ inch, thickness in the centre $\frac{1}{12}$ inch. Gradually sloping to a thin circumference. External surfaces tuberculated towards the middle? Presenting a horizontal plane of rectangular chambers, passing through the centre, with laminiform cells on both sides. *Loc.* cliff at Takah.

——— 2nd *Species?* Circular, doubly convex, terminating in a rim of unequal breadth. Convexities sub-central. Breadth $\frac{5}{12}$ inch, thickness $\frac{2}{12}$ inch. External surfaces tubercled over the convexities. Internally presenting a horizontal line of chambers, passing though the centre, from which white lines of laminiform cells radiate to the circumference. *Loc. idem.*

——— 3rd *Species?* A little larger than the foregoing, but with the rim turned up, like that of a hat. *Loc. idem.*

——— 4th *Species?* The same kind, but one side only presenting the hemispherical elevation. *Loc. idem.*

Operculina.— *Species?* Sub-elliptical, very thin. Length $\frac{3}{12}$ inch, breadth $\frac{5}{12}$ inch. Consisting of two whorls. Chambers apparent externally, long, narrow, and much reflected, increasing in length suddenly after the first whorl. Externally presenting minute tubercles, disposed over the commencement of the whorls, and then following the lines of the chambers. *Loc.* cliff at Takah.

Obs.—The second species is *Lycophris dispansus*, which abounds at Lukput, in Cutch. (Grant's Geol. Cutch. pl. xxiv. fig. 16. Geol. Trans. vol. vi. 4to.) What I have described as several species may be after all but varieties of one animal, for they appear to assume all kinds of shapes. They abound in Sindh, and one extraordinary form of them there resembles two convexo-concave disks, joined together by their convexities. The first species is not improbably a nummulite, as both *Lycophris dispansus* and large nummulites occur together in Cutch, and appear to pass into each other, while my description is chiefly taken from sections and half exposed specimens imbedded in the parent rock. Dr. Carpenter, who has given some beautiful sections of Orbitoides in the Quart. Jour. Geol. Soc. vol. vi. Plates 4—8, considers, page 36, these fossils to be allied "rather to the nummulites than to the orbitolites," and in his concluding paragraph states: "The Foraminiferous character of Orbitoides appears further to be indicated by the presence, in all the species I have examined by sections taken though the centre, of the large globular cavity (fig. 35, a), resembling that which is stated by M. D'Orbigny and Mr. Williamson to be the ordinary form of the first segment of the Foraminifera, whatever may be the form which the compound structure may subsequently present."

The character, however, on which I would place most reliance, in pronouncing these fossils to belong to Foraminifera, is the spiral arrangement of the central plane of cells, which I think not quite so satisfactorily shown not to be the case in fig. 31 of the sections to which I have referred, wherein Dr. Carpenter states, p. 32, the cells may be seen "arranged in regular concentric rows," as one could wish. No doubt it is very difficult to hit upon the centre of this plane in specimens where it is very thin, but until I can do this myself, or see that it has been done by others, I shall not be satisfied that Orbitoides are without this character, which the imperceptible gradations of nummulites into them would *à priori* lead one so strongly to suspect.

Whatever the structure of these fossils may be, or however numerous their varieties and species, their presence at Takah, not far from the centre of the South-east Coast of Arabia, is sufficient proof of the existence of the Nummulitic Series here; though I am ignorant of the exact position in the series which these fossils occupy. Hence we must regard the cliff at Takah, which has only an elevation of 90 feet above the level of the sea, as a part of this formation, and, moreover, we must regard it as a part of the compact white limestone, breaking with a conchoidal fracture, on which some miles back in this cliff we saw the dark brown limestone reposing. The end of the cliff at Takah, that is the part

under consideration, has undergone much disturbance, and, though low, has fallen forward in great square blocks, which present a large quantity of corals in their composition, while the rents in the plain between the base of the table-land, here transformed into mountains, and the sea, a distance of about two miles, bear ample testimony of the distorting forces to which this locality has been subjected. It is opposite Takah, as before stated, that the bed of recent Operculina exists, in twenty-five fathoms water, with a fine sandy bottom, which are identical with that species which forms whole strata almost, in the Nummulitic Series at Măskat. Hundreds of them came up on the grease of the sounding-lead at each throw, and for several miles in extent, when this part of the coast was surveyed.

At Takah, as just mentioned, the sea-cliff ends, and the maritime plain between the base of the high land and the sea sinks from 100 to about 10 feet above the latter; it also expands westward from this point, for the mountains recede, and give place to a flat area, twenty-two miles long, and from ten to fifteen miles deep in the centre: this is called Dofar, and is the most fertile district on the coast. Over this plain is spread a continuation of the miliolitic deposit, which we have seen topping the plain at Marbat, and the low cliff just passed, but it is more uniform in its composition, and more free from dark particles of the igneous rocks; hence it closely resembles the miliolite at Ras Abu Ashrin. On it are the remains of several towns, one of which, called El Bălăd, I have described.* They were built of this freestone, and they contain a vast number of columns, ornamented in arabesque, which have nearly lost their figured surfaces where exposed to the weather. This deposit seems to average about 10 or 12 feet in depth. In many parts of it there are extensive cracks, or *khors* as they are locally called, some close to the beach, which are always full to the brim of fresh water; that, for instance, at El Bălăd, is more than two miles long, and in one part about 100 yards broad, and flows over the beach, though no stream can be seen running into it. It is the presence of these *khors*, and the looseness of the soil, which renders Dofar so fertile, in comparison with the rest of the coast.

Passing along the cord, or sea shore of this half-moon-shaped plain, we at length arrive at its opposite or western extremity, where the high land, as at Takah, comes out again to within nearly the same distance of the sea; we also find this end of the plain elevated again to about the same height as at Takah, and consequently a sea-cliff

* Journal Royal Geograph. Soc. Vol. VI. Trans. Bombay Geograph. Soc. Vol. VII.

in front of it, which presents a similar geological section to that examined four miles west of Marbat; commencing from below upwards, it is as follows:—

At high-water-mark, or a little lower, is a white compact limestone, of a fine structure, and breaking with a conchoidal fracture, on which rests the dark brown limestone first seen beside the granite hills at Marbat, close to the sea; this is ten and a half feet thick here, and presents, in its upper part, a stratum, two and half feet thick, of large rounded pebbles; these pebbles are of compact white limestone, and are from the older formations. On them lies a bed of large oysters, one and a half feet thick, and with these the color of the limestone changes from dark brown to a greenish reddish dirty white; it also now becomes shelly, and presents radiated masses of columnar coral, with a great number of casts of smallish bivalve shells (Conchacea et Ostrea); further it is rendered more or less impure, and derives its reddish color from the presence of red argillaceous earth, disseminated here and there throughout the whole mass; this stratum, including the bed of oysters, is seven and a half feet thick. Next above it comes seven feet of still more impure limestone, composed chiefly of small rounded gravel from the older limestone, mixed with an increased quantity of red argillaceous earth, which gives the whole stratum a red color. And on it again comes twenty feet of white shelly limestone, similar to that first described. This forms the section of the cliff, and against the upper part of the dark brown limestone and lower white shelly limestone rests the miliolitic deposit of Dofar, six or eight feet above high-water-mark, filling many holes in the former, which have been made by lithodomous animals, and containing oysters of the same kind as those of a bed close by. Walking inland from the cliff, however, for about a mile, we come to fifty feet of limestone gravel, and pieces of flint, imbedded in red argillaceous earth, similar to that mentioned, and this is capped again by five feet of limestone pebbles and flints of a large kind, with less red earth. These deposits add to the thickness of the section, but will be found by-and-bye to depend probably on local causes.

Hence we see that here, about the centre of the South-east Coast of Arabia, we not only have the miliolite, but we have, in addition, another littoral deposit, viz. the compact brown limestone, with the whiter shelly limestone above it, making in all about fifty feet in thickness of a deposit totally different from, and lying inferior to the miliolite; and that it rests on a compact limestone, belonging to the older formation, must be inferred from the presence of the nummulites? and orbitoides in the cliff at Takah, on which a few miles back the brown lime-

stone is seen to repose, but this will become more evident as we proceed.

I have stated that the mountains advance towards the coast here, but the coast-line also turns here from running east and west, to south, and then south-east, a little way before it resumes its original direction; that is it is reflected to form a little bay here, called the Bay of Resut; and hence the maritime lowland, which is narrowed at this end of Dofar, is widened again, not in this instance by the mountains receding from the shore, but by an advancement of the lowland upon the sea, and with this advancement the lowland also is bordered externally by a ridge, which in one part is 700 feet high, and scarped upon the sea throughout. Thus, then, we have a valley between the sea-cliff of this ridge and the mountains; a small promontory formed by the end of the ridge, called Ras Resut, and inside it the bay mentioned of the same name. Now into this bay we have the opening of a torrent bed a mile wide, coming not only from the valley itself, but from among the mountains, and the section of the cliff just given is taken from the inner corner of the opening of this torrent bed upon the sea. This, then, accounts for the additional strata of red earth, flints, and pebbles, before mentioned, and which we did not see in the section taken four miles west of Marbat, where the cliff is within two miles of the base of the mountains, and on a straight part of the coast, far removed from the influence of any great torrent deposit. We therefore must not include in this littoral deposit this 50 feet of red earth, pebbles, &c., because it is evidently a local accumulation.

Passing across the sandy beach which lies in front, and in the dry weather closes the mouth of this torrent bed, we arrive at its opposite or external corner, which is close to the base of the ridge mentioned, and that of the small promontory which shelters the bay. This corner, like the other, presents a low cliff, consisting of little more than the dark brown limestone we saw on the other side, and which, running along the base of the promontory parallel to the sea, and scarped upon it for about eight feet, is washed by the waves into that extreme cragginess so characteristic of the stratum in other parts. This deposit rises no higher, while the height of the promontory is two or three hundred feet above the sea at its base, and two hundred at its extremity. Here, then, we have compact white limestone rising up to form the ridge of the promontory, while we have the dark brown limestone remaining in a horizontal line at its base. Nothing, therefore, can be more plain than that this white compact limestone, which we have seen all along underlying the dark brown limestone, is a part of another series, and the presence of

the nummulites? and orbitoides at Takah, as before stated, shows that this is the Nummulitic Series.

Hence there are here, nearly in the centre of the South-east Coast of Arabia, two distinct littoral formations, later than the white limestone strata forming the tops of the mountains; and as this part of the coast, in which they are so evidently seen, is also circumscribed by natural limits, I will briefly recapitulate what I have stated respecting it, before proceding further.

We have just seen that there are two bays here, which look towards each other, the one called Marbat, the other Resut; and they are separated by forty miles of coast, running E. and W., which is straight, and backed by the table-land the whole way. At Marbat we have seen a plain of igneous rocks, and the precipitous face of the table-land, which lies behind them; and in the bottom of the bay we have seen a dark brown compact limestone formation peeping above the sand close to the sea on the inner side of the granite hills, at the base of the table-land; a miliolitic deposit capping the granitic plain, and a still more modern deposit towards its circumference. We have also seen, four miles west of Marbat, the cliff of the maritime plain there, narrow, raised 100 feet above the sea, and presenting a dark brown, rough limestone, resting on a compact white one breaking with a conchoidal fracture; above the brown limestone, a stratum of a lighter color, but still compact, and then five feet of the miliolite, with rolled limestone pebbles of the older formation. Following this cliff for a certain distance, we have found the compact white limestone at the base rising to 90 feet high at Takah, and denuded of the other strata, but giving us decided evidence of its nummulitic character, by the presence of nummulites? and orbitoides. Then we have the miliolitic deposit spreading out over the district of Dofar; and at Resut the dark brown limestone again forming part of the sea-cliff, and resting, as before, on the compact white limestone, which, in the outer half of the bay, rises from below it to form the upper part of the promontory of Resut. Above the dark brown limestone here also we have an impure white compact limestone, as in the cliffs between Marbat and Takah; and adhering to the side of the cliff, which is partly formed by these two in the Bay of Resut, a portion of the miliolitic deposit. Thus we have the same kind of littoral deposits throughout the straight part of this portion of the coast, and the same at the bays of Resut and Marbat, but with this difference, that the fundamental rock of the former is limestone, and that of the latter granite. There is an entire absence of igneous rocks at Resut, whereas at Marbat there are hardly anything else.

From Ras Resut, which at its extremity is about 200 feet high, a sea-cliff is continued on for twenty-three miles, to the base of the great promontory called Ras Sejär, which is formed by the advancement of the mountainous tract upon the sea. This cliff I had not an opportunity of examining much, as it is perpendicular, and rises directly out of the water. What I did observe, however, is interesting.

I have just stated that there is an entire absence of igneous rocks at Resut, but, though this is the case, they are not far distant, one would think, for not only the limestone of the cape is shivered into atoms, and rendered pink by heat, but six miles further on the base of the cliff is similarly fractured where it is 700 feet high. This point is called Ras Hammar, and is the maximum altitude of the cliff. Ras Hammar is composed of compact white limestone above, and of the comminutely fractured limestone mentioned below, but I am ignorant of what lies between, further than that the whole is white calcareous strata, and that among these there are some of a marly cretaceous nature, from which the Bedouins cut their pipes, similar to that at Marbat. The brecciated limestone, for such it is, from the crevices having been filled up by a cement, and that too of the same material, is of a dense compact fine structure, lithographic, but breaking with a splintery fracture, heavy and hard, and of a light grey color. By a rough analysis, it contains from 12 to 15 per cent. of magnesia. Its specific gravity is 3.3. It scarcely effervesces with acids until pulverized, and its great weight and hardness appear to be owing to the presence of silex.

In this limestone is a cavern, similar to those which abound in the mountains, and one of which I visited near Takah. Its base is just above high-water-mark, and its roof is about 30 feet high, and hung with stalactites, not of magnesian limestone, but of sulphate of lime. From the face of the cliff presenting innumerable excavations of lithodomous animals, on a parallel with the upper part of the roof, and the brecciated state of the limestone, it is probable that this cavern commenced with the latter, and was subsequently washed out by the waves, while the cliff was rising from the sea. That which I visited, near Takah, is in the mountains, and I have given a description of it in this Journal.* It was inhabited, and is about 150 feet span and 50 feet high, (not yards, as stated from oversight in the description to which I have referred,) and 30 yards deep. Its roof is also smoothed, and hung with thick stalactites : another cavern, of equal dimensions, close by, had fallen in. We saw some from the vessel in the elevated scarps of the mountains in different localities, which, judging from the size

* Vol. III. No. xiv. p. 253.

they appeared at the distance we were from them, must be of enormous dimensions: They form the principal habitations of the Bedouins of these parts, and descend from father to son as hereditary property.

From Ras Hammar we pass along the remaining part of this cliff to the base of Ras Sejăr, which it joins after a distance of twenty-five miles from Ras Resut ; diminishing gradually in height after Ras Hammar, until it arrives at this point. Ras Sejăr is the largest and highest promontory on this coast : it is an advancement upon the sea of the great mountainous tract which from this point south-westwards, for a distance of sixty miles, presents no maritime plain whatever, but descends directly to the sea in long slopes or in precipitous steps. The ridge of the promontory has been computed by trigonometrical measurement to be 3380 feet above the level of the sea, and the bluff at its extremity 2770 feet. The eastern side is scarped perpendicularly for 800 feet, and the strata, which are composed of white and grey limestone, are disposed horizontally. At one part of the talus of this cliff is a little island, on which exists the dark brown limestone and miliolitic deposits seen in Dofar, but the latter is much finer in structure. After this I did not recognise the brown limestone, though doubtlessly it or its representative exists here and there throughout this coast.

The south-eastern side of Ras Sejăr, which is parallel with the coast, and its south-western extremity, the highest point of the cape, present an almost vertical scarp, in which the strata are seen to dip towards the north-east; while on the south-western side, the same horizontality is seen which we observed on the eastern side, but with a scarp rising by high precipices and narrow shelves to the ridge of the promontory, which I have before stated to be 3380 feet above the level of the sea. At the point where the coast line turns from running N. E. and S. W. to about N. W., for a short distance, is the great bluff of Ras Sejăr, and the following is its geological section, from below upwards :—

The first 25 feet above the sea is composed of a fine-grained micaceous sandstone or quartzite, of a blueish grey color, thinly stratified, and breaking with a rough fracture across the planes of stratification. It is weathered into holes indicative of the presence of organic remains, and in some parts is veined with white quartz. There is hardly any difference, except in color, between it and the upper part of the micaceous sandstone at Marbat. On this rests 175 feet of variegated argillaceous strata, principally of a red color, containing many fossils,

and above all again the white limestone strata, which, deducting the thickness of the sandstone and colored deposit from the total height of the bluff, amounts to 2570 feet.

Having on the base of this section measured with my eye, as carefully as I could, the height of the lower projection of the bluff above the sea, for I had no means of obtaining it in any other way, I find, when I come to multiply this on the outlines of the bluff, which I made at different distances, that the latter does not amount to more than 1950 feet above the sea, which is 820 feet less than it was computed to be by trigonometrical measurement: possibly, and not improbably, from the place where the base was measured, the angle was taken from a point much higher than the summit of the real bluff. The height of the limestone bluff at the island of Hălläniyah being 1645 feet, and the estimated thickness of the limestone at Marbat about 1800 feet, together with the trigonometrical measurement of the scarp of the next promontory we shall come to, which is limestone from the water's edge to its summit, being 1900 feet, seems also to indicate, from the thickness of the limestone at these places, that my measurement of the bluff at Ras Sejăr is more correct than that obtained by triangulation, but probably from the reason above mentioned.

I collected no fossils from Ras Sejăr, beyond some small imperfect specimens of the genus Turritella? from the colored strata.

It is to the blue grey sandstone of this promontory that the late Capt. Newbold alluded when hinting at the origin of the quartzite pebbles in the conglomerate underlying the nummulitic strata at Măskat, and resting on the euphotide and diorite of that locality.* A little further in from the extremity of Ras Sejăr on the south-west side, where the precipitous part of the promontory is much higher than at the cape, this sandstone is also raised to 300 feet above the level of the sea; and my impression is that here, as well as at Marbat, its strata are not parallel with those immediately overlying them, but dip towards the north; still I am far from being certain that this is the case.

As on the other parts of the coast, so on the lower part of Ras Sejăr, there is a thick line of the miliolitic deposit, adhering to the side of the cliff, 150 to 200 feet above the level of the sea. On the south-western side of the promontory I think I also saw it again, reaching down to the water, for there are dwellings excavated there in a yellowish white deposit, which can only be this or micaceous sandstone, and it is not likely to be the latter, from its hardness and dark color. At all events, it exists again at Rakot, a little village at the mouth of a

* This Journal, Vol. III. Part ii. p. 27.

ravine-like valley, seven miles to the westward of Ras Sejär. Here it is of considerable height and thickness, and of a finer structure than any on the coast. While I was knocking off some specimens, the Bedouins who were with me asked me if I wanted any *khat*, which means "white writing chalk," because, if I did, it was to be found in the upper part of Ras Sejär. From this it would appear that the chalky stratum we have met with here and there from the island of Hammar el Nafur onwards also exists on the top of this cape.

Between the last named village and a town called Damkot, some miles further on, are more dwellings, close to the sea, at the bottom of the slope of the high land. These also appear to be cut out of the miliolitic deposit: the place is called Jädäb. The high land also presents a more extended tabular outline here than hitherto met with, and continues to do so on to the neighbourhood of Damkot, forty-five miles from Ras Sejär, where it becomes broken, and thrown up into mountainous peaks again, the summits of which are about 3000 feet above the sea. This form of the coast continues on for some distance, viz. to the opening of a valley called Shagot, where the coast-line turns to the south, and the scarped mountainous ridge, here precepitous upon the sea, pursues its original course south-west, under the name of the Fattak range. A lowland shore, therefore, commences at this point, which, as the coast trends southward, is continued on till it meets the lower hills of a mountainous ridge called the Fartak range, a distance of forty miles. Between these two points, viz. the Fattak and the Fartak ranges, it extends inland or south-westward as far as the eye can reach, and is the only part of this coast where the mountain ridges which face the south-east appear to be separated by any great interval. The sea-cliff of this lowland varies with the height of the lowland itself, but seldom reaches 100 feet. I had an opportunity of examining it about its centre, where its cliff is 60 feet high, and the following is the section from above downwards:—

First six feet of a coarse sub-cellular limestone, breaking with a rough fracture, and of a light brown color, resembling in structure the dark brown limestone of Resut. This becomes mottled with red about its lower part, and passes into a red argillaceous chalky deposit, which at the water's edge becomes of a greenish white color, uniform in its dark appearance and structure, and of a moderate hardness. Here also, 15 feet above high-water-mark, is a line of the miliolitic deposit, adhering to the side of the cliff, and composed of the calcareous sandy material before noticed, in which are imbedded a number of shells.

There is a pebbly beach at this place, composed of rounded pieces

of more or less compact limestone, and concretionary flints ; also here and there a large piece of extremely fine limestone, of a lithographic structure, from one to three feet in diameter, probably the altered remains of fossillized madrepore. I saw no pebbles or traces of igneous rocks here ; indeed this part of the coast seems to have undergone less disturbance than any other, although the line of miliolitic deposit shows that, like the rest, it is experiencing gradual elevation.

The cliff of which this is a section is more or less continuous from this point on to the lower hills of the Fartak range, which commences in an angle close to the sea. One side of it runs inland and south-westwards, which is the grand direction of the range, and the other southwards, to end in the cape called Ras Fartak. This angle is about fourteen miles from the cape. Here the strata of the lowland cliff also become elevated, broken up, and confused, and this confusion extends to within six miles of the cape, where the irregularity ceases, and the uppermost stratum of the white limestone series can be seen emerging from the water, and pursuing its course to the top of the escarpment, which is 1900 feet above the level of the sea, after which it assumes a horizontal direction, and continues on to the summit of the cape : in this way stratum after stratum of this cliff may be seen rising from beneath the water, until the lowest runs almost parallel with it ; so that no better place could be visited than this for examining deliberately and without interruption the strata of which this great limestone formation is composed. I had only an opportunity of visiting one part of it, and this was where the strata had become horizontal, and where a portion of the face of the cliff, having fallen off, enabled me to obtain from the talus thus formed a knowledge of a good extent of the lower part of it. It consists of more or less compact, more or less cavernous, and more or less saccharoid white limestone, which again is more or less mottled, or rather veined with dark brown saccharoid magnesian limestone. I saw no traces of fossils in it, except a few minute species of Foraminifera, of the genus Alveolina (d'Orbigny). In one part the rock is entirely saccharoid, sparkling, uniform in structure, and of a grey color, in fact dolomitic, and on a rough analysis yields 16.4 per cent. of magnesia, with a specific gravity of 3.07. It is an interesting fact, bearing, perhaps, upon the formation of dolomite, that the dark veined portions here are of magnesian limestone, effervescing feebly with acids, while the whiter portions bubble up as usual when touched with them.

As we approach this extremity of the Fartak range, which forms the cape called Ras Fartak, and which is also the south-western limit of

the great bay of El Kammar, a reddish tint makes its appearance at the base of the cliff, close to the water, and on turning the corner we observe, by the truncated end of the cape, that this is the commencement of the argillaceous strata, which, rising towards the west at an angle of 45°, reach an altitude of from 1000 to 1200 feet on the opposite side of the cape. The base of the cape, I should state, is much in advance of the upper portion, and this advanced part consists of the series mentioned, to the geological section of which let us now turn our attention, having considered that of the white limestone strata which lie above and behind it, on the eastern side of the cape. Commencing from the summit of this advanced portion, and proceeding downwards, (though this section was obtained by following the base of the cape from east to west, and noting the strata as they emerge successively from the sea,) we have at first 300 feet of fine compact limestone, of a light violet color, breaking with a smooth conchoidal fracture, and containing small Orbitolites, and other fossils. Then a wide stratum (say 50 feet thick) of a red argillaceous limestone, presenting the same kind of fossils, but more numerous, with Echinodermata. Next follows 20 feet of greenish yellow argillo-calcareous strata, splitting into thin laminæ, on which are seen the remains of a few minute bivalve shells, and marks similar to those made on mud by small crabs and annelides. After this comes 10 feet of a red, ferruginous-looking, argillaceous limestone, and, following it, a stratum of a blueish grey argillo-calcareous siliceous shale, exhibiting, where exposed to the atmosphere, a jointed structure, and thick laminæ. This is succeeded by 30 feet of blue marl, compact above, and soft below, in which are remains of Echinodermata, Ostracea of the genus Exogyra, and pyrites. Next comes 300 feet of impure limestone, compact, and of a pinkish grey color, the lowest hundred feet of which (the only part I examined) is almost wholly composed of small Orbitolites, with the remains of a few small Echinodermata. This is the last stratum towards the west which emerges from the sea: it is opposite the little village of Khaisêt. After this, the remaining part of the extremity of the cape is confronted by a narrow sandy beach, from beneath and behind which the colored strata continue to rise in the same manner as from the sea, to the extent of 500 feet in thickness: this 500 feet is composed of impure limestone, compact, and of a dark red color, and ferruginous aspect; fossiliferous, and abounding in large cavities and fissures, which appear to have been caused by some subterranean force, for the rock has been shattered throughout, and cemented together again by its own material. Among the more thinly stratified deposits of the upper part

of these colored strata are bands of brighter colors, which have not been mentioned: these consist of much the same kind of material as that with which they are in contact, or form a part, and give to the whole a variegated appearance when near, but, when viewed at a distance, are lost in the prevailing red color of this series.

The following are the fossils which I gathered from these strata here and at Ras Sharwên, the next large cape, which is sixty miles further west, but a part of the same formation:—

ZOOPHYTA.

Astrea.— *A. textilis.* Goldf. (Tab. 23, fig 3.) mihi. Hemispheric, covered with conical projections, which are more prominent in the upper part than towards the base; and marked with striæ, which radiate from their summits. Horizontal diameter $\frac{8}{12}$ inch. *Loc.* Ras Fartak, from the pinkish grey limestone.

Orbitolites.— 1st *Species?* Conical, obtuse, excavated. Breadth $\frac{2}{12}$ inch, height $\frac{1}{12}$ inch. External surface presenting striæ in concentric rings; internal surface presenting striæ radiating from the centre to the circumference. Structure solid, composed of minute cells. *Loc.* Ras Fartak, chiefly in the pinkish grey limestone.

———— 2nd *Species?* Conical, acute, deeply excavated. Breadth $\frac{1}{8}$ inch, height $\frac{1}{12}$ inch. External surface presenting striæ in concentric rings. Structure solid, composed of minute cells. *Loc. idem.*

———— 3rd *Species?* Flat, circular, wavy, thick; diminishing in thickness towards the circumference. Breadth $\frac{1}{12}$ inch, thickness $\frac{1}{12}$ inch. *Loc. idem.*

———— 4th *Species?* Discoidal, flat, and extremely thin. Breadth $\frac{6}{12}$ inch. External surface presenting striæ in concentric rings. *Loc.* Upper red stratum, Ras Fartak.

ECHINODERMATA.

Spatangus.— 1st *Species?* (Spec. imperfect.) Oval. Length nearly $1\frac{1}{2}$ inch, breadth anteriorly $1\frac{1}{2}$ inch. Truncated posteriorly, slightly grooved anteriorly, ridged posteriorly. Ambulacra five, sub-petaloid, all the same length, in deep furrows. Vent sub-dorsal. Base impecfect. *Loc.* Ras Sharwên.

———— 2nd *Species?* Thick, round, heart-shaped. Length $1\frac{3}{4}$ inch, breadth anteriorly $1\frac{6}{12}$ inch, and height 1 inch. Grooved antero-dorsally. Ambulacra five, two anterior shortest. Buccal orifice sub-terminal, simple. Base not carinated. Vent sub-dorsal. Genital pores four. *Loc. idem. Obs.*—There is another specimen similar to this, and from the same locality, $1\frac{1}{2}$ inch long.

Spatangus.— 3rd *Species ?* Thick, round, heart-shaped, like the foregoing, but much smaller. Length $\frac{1}{2}$ inch, breadth anteriorly $\frac{9}{10}$ inch, and height $\frac{6}{10}$ inch. *Loc. idem.*

Discoidea, (Gr.)— 1st *Species ?* Sub-pentagonal, excavated. Breadth 2 inches, height 1 inch. Ambulacra extending to the buccal orifice, which is median. Vent sub-marginal, pear-shaped, convex posteriorly. Genital pores five. *Loc.* Ras Sharwên.

——— 2nd *Species ?* Conical, circular, elongated towards the apex, which is acute. Breadth $1\frac{7}{10}$ inch, height $\frac{8}{10}$ inch. Ambulacra, buccal orifice, vent, and genital pores the same as in the foregoing. *Loc. idem.*

——— 3rd *Species ?* Sub-pentagonal, conical. Breadth $1\frac{1}{2}$ inch, height $\frac{8}{10}$ inch. Buccal orifice, vent, &c. the same as in the foregoing species. *Loc. idem.*

——— 4th *Species ?* Sub-pentagonal, convex. Breadth $1\frac{4}{10}$ inch, height $\frac{5}{10}$ inch. Buccal orifice, vent, &c. the same as in the foregoing species. *Loc. idem.*

——— 5th *Species ?* Conical. Breadth $1\frac{1}{2}$ inch, height $\frac{8}{10}$ inch. Vent sub-marginal, longitudinal, pointed at each extremity. Buccal orifice, pores, &c. as in the foregoing species. *Loc. idem.*

——— 6th *Species ?* Circular, convex. Breadth $1\frac{4}{10}$ inch, height $\frac{6}{10}$ inch. Buccal orifice, vent, genital pores, &c. the same as in the last. *Loc. idem.*

——— 7th *Species ?* Circular, depressed. Breadth $1\frac{4}{10}$ inch, height $\frac{4}{10}$ inch. Buccal orifice, vent, genital pores &c. the same as in the two last species. *Loc. idem.*

Pygaster, (Ag.)— *Species ?* (Specimen imperfect.) Small, circular, thick, convex. Breadth $\frac{7}{10}$ inch, height $\frac{3}{5}$ inch. Slightly excavated. Ambulacra five, narrow, extending to the buccal orifice, each presenting a double row of small tubercles. Inter-ambulacral spaces furnished with a double row of large tubercles, each tubercle sunk within an elevated ring, and the latter bordered on both sides by a small circle of tubercles. Buccal orifice median. Vent pear-shaped, margino-dorsal, longitudinal, round posteriorly. Genital pores five. *Loc.* Ras Fartak.

Echinus.— 1st *Species ?* Circular, depressed, slightly excavated. Breadth $1\frac{4}{10}$ inch, height $\frac{4}{10}$ inch. Tubercles small throughout. Ambulacra narrow, and extending to the buccal orifice, which is median; their extremities widely separated at the vent, which is medio-dorsal. *Loc. idem.*

——— 2nd *Species ?* (Spec. imperfect.) Hemispheric, circular. Breadth $1\frac{1}{10}$ inch, height $\frac{1}{2}$ inch. Tubercles small throughout. Am-

bulacra five, rather broad, bordered by four lines, or two double series of pores, extending to the buccal orifice, which is median; their extremities widely separated at the vent, which is medio-dorsal. *Loc. idem.*

Diadema, (Gr.)— 1st *Species?* Circular, depressed, slightly excavated. Breadth 1½ inch, height ½ inch. Tubercles small, perforated. Ambulacra bordered on each side by four lines of pores, extending to the buccal orifice, which is large and median; their extremities widely separated at the vent, which is medio-dorsal. Vent broken. *Loc. idem.*

——— 2nd *Species?* Circular, depressed, slightly excavated. Breadth 1½ inch, height $\frac{5}{17}$ inch. Tubercles large, perforated, almost all of the same size, sub-equidistant, and in vertical lines. Ambulacra bordered by two lines of pores, sinuous, extending to the buccal orifice, which is large and median, and widely separated at the vent, which is medio-dorsal. Vent broken. *Loc. idem.*

Salenia, (Gr. et Ag.)— 1st *Species?* Circular, thick, convex. Breadth 1 $\frac{1}{17}$ inch, height $\frac{8}{17}$ inch. Two vertical lines of large tubercles in each inter-ambulacral space, four tubercles in each line, imperforate. *Loc. idem.* Found in the pinkish grey limestone.

——— 2nd *Species?* Circular, thick, convex. Breadth 1 $\frac{9}{17}$ inch, height ½ inch. Two vertical lines of large tubercles in each ambulacral space, four tubercles in each line. *Loc. idem. Obs.*—The only difference which I can distinguish between these two specimens, excepting in size, is, that the plate resting on the dorsal extremity of the ambulacral space is concave in the centre in the latter species, and pointed in the former one. For a further description of Salenia, see Mongraphies d'Echinodermes, par Louis Agassiz, 1838; and for the genital plates of these two species see Tab. 1, figs. 1 and 22, respectively. The specimens above noticed are much worn and imperfect.

——— 3rd *Species?* Smaller than the foregoing, circular, compressed. Breadth $\frac{8}{17}$ inch, height $\frac{6}{17}$ inch. Three large tubercles in each line. Resembles the last specimen described in the form of its genital plates. *Loc. idem.*

CONCHIFERA.

Tubicola.— *Species?* Tube cordiform, or subcircular, simple; smooth internally, crenulated externally; dilating gradually from a small orifice to $\frac{8}{17}$ inch in diameter, and then expanding suddenly. Wall composed of successive additions, imbricated; internally presenting minute parallel longitudinal lines, running throughout. *Loc.* Ras Fartak, in the dark red ferruginous limestone. *Obs.*—A transverse section of the dilated part

gives a deep crenulated margin, presenting angular costæ and circular intervals, within which are several layers of the same form, (10—12), and white lines rading from the internal margin, which is even, to the circumference. These are the lines which appear longitudinally on the inner side of the tube. Tubes 3 to 4 inches long.

Isocardium.— 1st *Species?* (Cast.) Breadth $2\frac{5}{10}$ inches, height $2\frac{1}{2}$ inches, and depth $2\frac{5}{10}$ inches. Umbos $\frac{2}{10}$ inch apart. *Loc.* Ras Sharwên.

———— 2nd *Species?* (Cast.) Breadth $1\frac{1}{2}$ inch, depth $1\frac{1}{4}$ inch, height a little greater than the breadth. Presenting thin striæ on the surface. *Loc. idem.*

———— 3rd *Species?* (Cast.) Breadth $1\frac{2}{10}$ inch, depth 1 inch. Smooth. *Loc. idem.*

———— 4th *Species?* (Cast.) Breadth $\frac{9}{10}$ inch, height $\frac{9}{10}$ inch. *Loc. idem.*

Cardium.— *Species?* (Cast.) Breadth $\frac{9}{10}$ inch, height $\frac{9}{10}$ inch. Costæ few, and wide apart. *Loc. idem.*

Pecten quinquicostata, Sow.— mihi. (Inferior valve?) Breadth $\frac{5}{10}$ inch, height $\frac{9}{10}$ inch, depth $\frac{2}{10}$ inch. Margin hexangular; costæ prominent, formed by three narrow ridges, and the intervals by three broader ones. *Loc. idem.*

———— 2nd *Species?* (Inferior valve). Breadth $\frac{9}{10}$ inch, height $\frac{3}{10}$ inch, and depth $\frac{2}{10}$ inch. Margin hexangular; penticostate, a single wide ridge forming the prominent ribs, and two smaller ones occupying the intervals. *Loc. idem.*

———— 3rd *Species?* (Inferior valve.) Shell deep. Breadth 1 inch, and height $1\frac{3}{4}$ inch. Margin sub-hexangular, sub-quinquicostate, costæ narrow, regular. *Loc. idem.*

Ostrea.— *Species?* (Lower valve, imperfect.) Ovato-acuminated. Plicated, plaits radiating from an indistinct sharp umbo; striated concentrically, striæ lamellose, and imbricated towards the border, the latter crenulated. Length $3\frac{1}{2}$ inches, breadth $1\frac{1}{2}$ inch. *Loc. idem.*

Exogyra.— *E. flabellata*, Goldf. (Tab. 87, Fig. 6.) mihi. *Loc.* Fartak. *Obs.*—These abound in the blue marly stratum, and are of various sizes. The largest found is $2\frac{3}{4}$ inches long, and $2\frac{1}{4}$ broad, and the smallest 1 inch long, and of proportionate breadth.

GASTEROPODA.

Solarium.— *Species?* Breadth $\frac{1}{10}$ inch. *Loc.* Ras Fartak, in the deep red ferruginous limestone.

Turritella.— 1st *Species?* Slender. Length $1\frac{1}{4}$ inch. Whorls 12,

10—11 costæ in each whorl. *Loc.* Ras Fartak; red ferruginous limestone.

Turritella.— 2nd *Species?* Slender. Length 1¼ inch. Whorls 18—20, three costæ in each whorl. *Loc. idem.*

Ammonites.— *Species?* A small portion of the whorl, ⅟₁₀ inch wide; just enough to show that the suture is sinuous. *Loc.* Ras Sharwên.

Thus we see that the advanced or lower half of Ras Fartak is composed of marls, clays, sandy shales, and impure limestone strata, containing the above fossils, and of a variety of colors, but principally red, terminating above in violet-colored and almost white limestone. We have also seen, when facing this cape, that the strata of the range, of which it is the extremity, dip from west to east, and that the uppermost of the red or colored series, which is not more than 200 feet above the level of the sea on the east, is 1000—1200 feet above it on the west side of the cape. Passing on to the white limestone behind and above these strata, we find the latter denuded for some distance in from their upper edge, both on their southern and western sides, and not continuous with the white strata, as at Ras Sejăr, and at Marbat. This denudation of the upper part of the colored strata, and position of the white limestone series, I could not understand, until, from my sketches of the cape on different sides, I perceived that the strata, both white and red, of the range, dipped not only towards the east, but towards the north. We have already seen them at the extremity of the cape dipping from west to east. Hence, when we come to connect the inclination of all these strata with the existence of an argillaceous deposit about their centre, we cannot be surprised to find that the upper half has slid towards the north-east, and left the whole of the lower or colored strata in advance, which is the case; and this not only accounts for our not seeing the red strata at the bottom of the great scarp which faces the eastern side of the range, towards the Bay of El Kammar, but also for the presence of the sub-range of mountains which exists on its western side.

Difficult as it would have been to have joined these two series with the absence of the micaceous sandstone, and to have accounted for their relative position at this point, without having seen the inclination of the strata, yet the existence of Orbitolites in the white limestone at Marbat, and their abundance throughout the colored strata here, is sufficient to connect the two; and if any further proof be necessary, the finding of a piece of blue limestone at Marbat, almost entirely composed of small Orbitolites, and identical with the pinkish grey limestone of the same kind here, at once identifies the colored strata of both places, and establishes the position of the colored strata of Ras Fartak.

It is remarkable here, however, that the colored strata should be so expanded, and that the micaceous sandstone should not appear.

Thus we see that there are 1900 feet of white limestone strata in the cliff on the eastern side of the Fartak range, and from 1000 to 1200 feet of colored strata forming the advanced part of the cape, and that of the western side of the range. The additional height, therefore, of the main ridge, which has been computed by triangulation to be 2500 feet above the sea, must be accounted for by the inclination of the strata; for although the base of the white limestone is about the level of the sea on its eastern side, it must nevertheless, from the dip of the strata in this direction, be elevated for some hundreds of feet above the sea, where it rests on the colored strata on the western side of the range.

Before leaving Ras Fartak, I should state that the pinkish grey limestone, which is filled with small Orbitolites, and which rises from the sea just opposite the little village of Khaisêt, is perforated by the holes of lithodomous animals 30 feet above the level of the sea, and adherent to its side at the same height is a band of the miliolitic deposit mentioned, containing shells, which are in a white pulverulent state, and pieces of the adjoining rocks. This deposit, though not very compact, is sufficiently tenacious to form a building stone, of which the little tower now in ruins on the top of this limestone, which forms a conical hill here, was composed.

From Ras Fartak south-westwards, the coast line forms an obtuse angle with that just passed, and for some distance presents no cliff, but a low sandy shore, reaching back to that part of the Fartak range which I have before stated to run south-west. This sandy shore, which reaches inland for about six miles, continues along the coast for twenty-five miles, when it is limited by a tract of low rocky limestone mountains, which extend outwards from the range just mentioned. I should here state that the mountainous tract of this part of the coast, commencing with the Fartak range, is continuous on to the Yaffai mountains, at Bāb el Mandeb, with the exception of three great valleys, which here and there open upon the sea. The point which limits this low shore is called Ras Darjah; it is about 300 feet high, and composed of limestone. The following is a brief description of the cliff close to it, from above downwards, viz. pink, grey, white, and yellow compact limestone, in parallel strata from three to twelve feet thick, with here and there large round concretionary flints, peeling off in concentric layers. Some of the strata are friable, loose, and gritty, not unlike those at Hammar el Nafur and Ras Kariat, 432 miles off, and in like manner also contain a great number of small Echinodermata of the following kinds:—

Echinocyamus Annonii, Mirian, mihi. (Tab. 27, figs. 37—40. Ag. Mon. d'Echinodermes.) Length $\frac{1}{14}$ inch, breadth $\frac{1}{14}$ inch, and thickness $\frac{1}{21}$ inch. Vent a little distance from the margin. *Loc.* Ras Darjah.

E. alpinus, Ag., mihi. (Tab. 27, figs. 41—43. Loc. cit.) Length $\frac{1}{14}$ inch, breadth $\frac{1}{21}$ inch, and thickness $\frac{1}{21}$ inch. *Loc. idem.*

Obs.—Of this fossil Agassiz states, p. 135: "Mais ce qui rend surtout cette espèce intéressante, c'est son gisement. Je n'en connais que deux exemplaires qui font partie du Musée de Berne; ils ont été recueillis dans la chaîne des Alpes Suisses, à Burgenberg, près Stanz (canton d'Unterwalden), dans une sorte de conglomérat fossilifère noir appartenant au terrain crétacé, et contenant une quantité de fossils triturés, entre autres une grande nummulite." This remark is not less interesting here, where we find these little fossils in a similar deposit to that which exists at Hammar el Nafur and Ras Kariat, and which contains the same kind of fossils and nummulites; from which we might infer, if I am right in the identification of the species, that the cliff at Ras Darjah is formed of the upper part of the white limestone series, and that the loose and gritty part is identical with that in which similar Echinodermata, with nummulites, are found at Hammar el Nafur and Ras Kariat.

This group of rocks, and the sea-cliff which they present, do not extend far from Ras Darjah before they diminish in height, and become covered with a plain of yellow sand, of four or five miles in extent. The sand appears to be nothing more than a disintegrated part of the miliolitic deposit before mentioned, which here has been raised on the tops of the rocks, on which it was deposited, and, like that at Ras Abu Ashrin, has become loose on the surface, and now forms a smooth uneven tract, which, in its irregularities, correspond to those of the harder rocks beneath. It presents a sea-scarp of about 30 to 40 feet high, and ends at the little plain of Kashn; after crossing which we arrive at the mountainous tract again, which now advances to form the cape called Ras Sharwên.

This cape consists of a long narrow mountain, of a wedge-like shape, sloping towards the point, and presenting on its upper end two pinnacles; it is about two miles long, and scarped on both sides, as well as at the extremity; the latter at its lowest point is about 200 feet above the level of the sea, and the pinnacles about 1800 feet. Its longitudinal direction is about east and west, so that its inner face is opposite the main land, and it shelters a little bay inside it, which is called the Bay of Kashn. This mountain is composed of colored strata, identical with those which form the advanced part of Ras Fartak, and in like manner seems to have been denuded of the white limestone; but what has become of

the latter the land above water does not indicate; no doubt this wedge-shaped mountain was covered by it, as the next mountain to it inland presents the white limestone *in situ*. I might here content myself with referring the reader to the description of the colored strata at Ras Fartak, for those of Ras Sharwên, as I have placed the list of fossils from both places after the former, but it will be more satisfactory, perhaps, to give the observations which were made on the spot respecting their composition.

About a quarter of a mile inside the cape, where we landed, the upper part, which is not very high here, is composed of fine compact limestone, of a white or light grey color, presenting small Orbitolites, and a few remains of Echinodermata. This, after some distance down, passes into a violet, and then red colored argillaceous limestone, containing a great number of the same kind of fossils, together with bivalve and univalve shells; after which comes a yellow stratum, with blue and red bands intermixed, and then a blue deposit, almost entirely composed of small Orbitolites, like the pinkish grey limestone at Ras Fartak. The whole of these colored strata contain more or less argillaceous matter and siliceous sand. A little further in, where the red colored ferruginous strata emerge from the water, the same shattered appearance of the limestone is seen as at Ras Fartak, with calc-spar coating, and more or less filling its cavities.

Here, too, on the inner side of the cape, as on the pinkish grey limestone at Fartak, is seen a band of the miliolitic deposit adhering to the scarp 40 feet above the level of the sea, and containing in some parts, as at Fartak, large shells, and portions of the adjoining rock; while between it and the sea there is, as at other places, an interval of some yards, where it either never existed, or has been washed off by the waves.

Having finished with the inner side of Ras Sharwên, let us now go to the outer side of the cape, and here, too, a mile or two west of the latter, the red strata are again seen, but in the utmost confusion. This is owing to a mass of black scoriaceous basalt, which has forced itself up among them; and although it has not managed to reach the surface, yet, from being in the sea-cliff, a good lateral view is seen of it. It is about 300 or 400 yards long, and about 200 feet high. I had hunted in vain for a disturbing agent of this kind at Ras Fartak, and on the inner side of Ras Sharwên, but could see nothing *in situ* at either, though, from the presence of pebbles of black basalt about the base of the latter, I was led to infer that it could not be far distant.

This is the first place where we have seen an igneous rock since leaving

Marbat plain, a distance of 200 miles, and the first time we have met with black basalt on the coast; but we shall soon see that we have come to the commencement of a series of vents, which have poured forth large tracts of this igneous rock.

As we saw a raised sandy plain of the miliolitic deposit covering the low rocks east of Kashn, so we have a similar one west of Sharwên. It is coarser in structure than the miliolite of Ras Abu Ashrin, but otherwise almost identical with it. It begins close to the western side of the black basalt, which indeed it partly covers, and extends a short distance inland, and about ten miles along the sea, where it presents a cliff about 100 feet high. As before stated, it is raised, and, though smooth on the surface, takes the form of the harder and older rocks which lie beneath, while the presence of particles of basalt in it would seem to indicate that it has been formed since the eruption of that rock.

Leaving Ras Sharwên, and this tract of sand, the limestone formation continues to rise abruptly from the sea for twenty miles, when it falls back, and leaves a narrow strip of maritime plain, which is continued all the way to Ras Makalla, a distance of 140 miles, backed from one end to the other by the raised tract of limestone mentioned,—sometimes in the shape of mountains, at others in that of long portions of tableland; while extending along this narrow plain is the series of basaltic effusions to which I have alluded.

These commence immediately west of the opening of the great valley called Wadi Masilah, and about twenty miles from the beginning of the maritime plain, or forty miles from Ras Sharwên. They are three in number, and are called by the Arabs the "harieq," or "burnt place," from a superstition that they mark the sites of seven pagan cities, which were burnt down by the Imam Ali at the commencement of the Mahomedan Æra. They form the most remarkable objects of the kind on this coast, and are continued on to a little beyond the village of Raidah, a distance of forty-five miles from their commencement. The striking features of them are their intense black color, their flatness, and horizontal extent, defined borders, and the contrast they form with the white color of the plain, and that of the limestone mountains behind them. Each tract presents one or more cones in the centre, which do not appear to be more than 200 feet above the basaltic plain immediately surrounding them.

The first cone is about four miles from Saihut, or about 50 miles west of Ras Sharwên, and the tract of basalt which surrounds it has extended nearly to Wadi Masilah on the east, and joins the following tract on the west.

The next cone is opposite the opening of the valley called Wadi Shikawi, about nine miles from the last, and about three miles inland: its tract extends westward to Raidah, a distance of about eighteen miles, and eastward joins that of the foregoing, as already mentioned. I examined a part of this tract opposite the valley of Shikawi, where it extends into the sea, and its highest part, not including the cone, did not appear to be more than 30 feet above the level of the sea. The whole of the maritime plain here is covered with large and small boulders of black and grey basalt, more or less compact, more or less scoriaceous, breaking with a rough coarse fracture, and presenting olivine in its cavities. Some pebbles which I picked up on the beach were composed of fine compact basalt, in which distinct crystals of pinkish white felspar were imbedded. All the boulders were weathered smooth, and more or less round.

The third tract begins west of Raidah, and here the maritime plain, being raised from two to three hundred feet above the level of the sea, the basalt has not only overflowed it, but found its way into the watercourses, and appears in black rocks at their openings on the beach, contrasting strongly with the whiteness of the low limestone cliffs on each side of them. There are five cones in the centre of this effusion, which are all higher I think than either of those mentioned.

Here also the maritime plain widens out to an extent of fifteen miles between the base of the high land and the sea, and, being raised, presents a cliff which at the cape called Ras Bu Gashwa is 300 feet high, but diminishes gradually on either side for a few miles, until it subsides to the level of the beach. There are several portions of this part of the plain raised in isolated mounds 700 or 800 feet high, and the whole seems to have undergone much disturbance from subterranean causes: the district is called Hammam, from the number of hot springs here. I had not an opportunity of going on shore, so I can say nothing of the sea-cliff further than that above it is red, in the middle white, and below yellow; but we shall find it again at Makalla, and perhaps may be able to infer its geological character from the composition of the cliff at that place.

I have before stated that this maritime plain ends at Ras Makalla, to which we now arrive, and on turning which we observe that it consists of a ridge of igneous rocks, supporting limestone. This ridge presents an irregular scarp of two and a half miles in extent on its western side, and on its eastern side limits the maritime plain we have just left.

When we examine it from within outwards, that is from its base to

its extremity, we find that it is made up successively of granite, limestone, and green serpentiniferous diorite.

The granite forms the base of the cape, and is a part of a group of igneous rocks which extend a little further inland. It appears here in the form of a mountain capped with limestone, the summit of which is 1300 feet above the level of the sea; that of the granite appears to be about 1000 feet. It is of a dark grey color, and uniform fine structure, and, from its amphibolitic admixture and freshness, seems more allied to syenite or diorite than old grey granite. Be this as it may, it is dyked with the green earthy diorite of the locality, and, suddenly sinking towards the cape, disappears in low peaks beneath the limestone, while the latter then forms the ridge for some distance, and is about 600 feet high. After this follows the green diorite in round topped hills, which compose the outer third of the cape, still diminishing in height, and supporting an isolated portion of the limestone between them, a little distance from the extremity. The diorite presents an earthy base of a greenish color, with crystals of dark green hornblende scattered through it; it is richly serpentiniferous, and sometimes appears like green euphotide. Where it forms a breccia with the calcareous material of the loccality, an amorphous thin layer of calc-spar, with grass green serpentine, exists between the two; indeed the serpentine appears to tinge the former.

The limestone strata, which appear to be between 300 and 400 feet thick, are, in the immediate vicinity of the granite, fractured throughout, and united again by their own material, so that all appearance of continuity in their stratification has been destroyed; but in the cliff which they present in the central third of the cape, and which is about 250 feet high, they are entire, and composed as follows, viz. above of compact cellular limestone, of a pink color, presenting in one part a stratum filled with the moulds of small shells, in which there is more or less crytallized gypsum. This part also effervesces slowly with acids, and is identical, as before stated, with the same kind of limestone sent me by Lieut. Grieve from Ras Markas, near Ras Jazirăh, that is as far as structure and mineralogical characters are concerned. Beneath this compact pink limestone comes a more siliceous one, filled with large cavities, which are lined with hyaline quartz and calcedony. Then follows a white stratum of more or less impure siliciferous limestone, and beneath this a dark red-colored deposit, chiefly composed of fine siliceous sand, which rests on the granite.

Though there are no separate fossils here, the upper strata abound in traces of them, and in some parts they are almost entirely composed of

small Foraminifera, allied to Nummulina. In another part of the limestone formation here, close to the granite rocks, but not in contact with them, or forming part of the ridge of the cape, small Foraminifera also abound, as at Máskat, and particularly the Operculina of that locality. I did not see any nummulites, but I think it will hereafter be found that they are not more a character of the Nummulitic Series than the abundance of small Foraminifera which exist in the limestone strata belonging to it, and indeed of which many are, with the addition of microscopic species, almost entirely composed.

Besides this limestone, we have here again the miliolitic deposit, forming in one part a bank 30 feet above the level of the sea, and in another adhering to the upper part of the scarp of the limestone cliff, extending to the cape from 60 to 100 feet above the level of the sea; while we have blocks of it on the shore on the inner side of Makalla, which have fallen down from the limestone on the top of the granite, 1300 feet above the level of the sea, slightly changed in structure, but still easily recognizable, and of a delicate color, like that of the pink or cream colored limestone in the same situation. The coarseness of the structure of these deposits at their three different heights, and the shells, pieces of coral, and parts of the old limestone rock which they contain, together with their modern appearance generally, indicate that they all belong to the same formation; but there is one difference, independent of the changes produced by heat, in the pieces which have fallen from the limestone on the top of the granite, viz. that it does not, like the other two, present portions of the green diorite. Thus it must have been raised up with the other limestone rocks before the eruption of the diorite took place, or all traces of particles of the latter must have been subsequently effaced. Still this does not interfere with the fact that this formation, which we have hitherto seen raised only 150 feet above the sea, viz. at Ras Sejăr, is here in one part 30, in another from 60 to 100, and in a third 1300 feet above its level, and in the last place so changed in color, that however young it may be considered to be, it must have preceded the eruption of the granite, and the elevation of the limestone on which it rests.

About three miles inland, north-east of Makalla, just at the outskirts of the group of igneous rocks which are continued into the formation of the cape, and among the lower hills of the great limestone tract, is a spring, from which the inhabitants of Makalla obtain their supply of water. This issues from a ravine situated among the lower limestone mountains of the table-land, which are fractured and fissured in all directions, and cemented together again by their own substance, except in some

places, where there are holes and caverns which have not been so filled up, and are more or less filled with water, both in the sides of, and leading into the interior of the mountains. The water of the spring mentioned is somewhat above the temperature of the air, but without taste or smell: in its course along the ravine it passes through sand, which has more or less accumulated on its sides, and in this sand is a quantity of botryodal magnesian limestone. The spheroids are of different sizes, up to an inch in diameter, which is the measurement of the largest obtained. They are of a coarse structure, formed of concentric layers, and present a rough arenaceous exterior. Some appear as if they had been formed in halves, from the two hemispheres not having been applied to each other in complete apposition. They are more or less adherent, and seem as if they were formed in the sand of the stream in which they were found.

Among the igneous rocks at Makalla exists a porphyry, with a dark red base, and large tabular crystals and nodules, of greenish felspar; also epidote with calc-spar, as at Masira. Mica prevails in some parts, and various other earthy minerals, which are generally found in company with such rocks.

Leaving Makalla, and proceeding south-westwards along the coast for about six miles, we meet with no sea-cliff whatever, but a sandy shore, with scattered hills interiorly, and then sub-ranges of mountains; behind which, and towering above all, is the brink of the table-land, here about 6000 feet above the level of the sea.

At Ras Brum, however, which is at the termination of this sandy shore, and which is opposite Ras Makalla, as the coast runs, igneous rocks again make their appearance, and from thence are continued on to Ras el 'Assidah, a distance of about fifty miles, after which they subside gradually in dark peaks, scattered here and there among the sand-hills of the coast.

This tract of igneous rocks fringes the shore for the distance mentioned, and is continued inland for two or three successive ranges, mixed more or less with limestone, to the base of the table-land, here fifteen miles from the sea. From their brown color and peaked appearance they closely resemble the granite of Makalla; and about Ras Brum, before stated to be opposite Ras Makalla, is the same kind of green-colored rock as that forming the outer third of the latter cape, viz. green diorite: at Ras Brum also it is in round-topped low hills like those of Ras Makalla, and separates the brown peaked mountains behind, which are 1000 feet high from the sea. In all probability these rocks are but a repetition of those forming Ras Makalla, but at Makalla my actual exami-

nations cease, and I can only now state that which I have seen of this part of the coast while sailing leisurely up and down it two or three times, and from the sketches I then made of it.

I have observed that these rocks are more or less mixed up with limestone,—the limestone no doubt through which they have been forced,—so that here and there white ridges appear among the dark brown rocks, and occasionally come to the sea, as at Ras Răttle, which is a conspicuous white mass of limestone five miles east of Ras el' Assidah. The islands, too, off Hisn Ghorab, a little east of Ras Răttle, viz. Hăllani, Jibus, and Baragah, are all of white limestone. Jibus, which is perhaps the largest, is five miles off shore, hardly a mile long, and about 300 feet high.

A little west of Ras Brum there is a long low level piece of pink or red-colored strata, bordering on the sea, and presenting a cliff similar to that of the raised part of the maritime plain at Ras Bu Gashwa ; it is probably an undisturbed part of the same formation.

The dark mound on shore, called Hisn Ghorab, famous for bearing the longest Hamyaritic inscription that has been met with, is stated (Wellsted's Trav. in Arab. vol. ii. p. 423) to be composed of a dark greyish compact limestone, 500 feet high ; and in further proof of the general elevation of this coast, which from what I have stated must now, however, be pretty apparent, it is also mentioned that "The action of the sea might be plainly seen [at the foot of this mound] in the cavities and hollows exhibited by a ridge of rocks now some distance from the water, but which evidently at some not very remote period must have been covered by it."

Between Ras el 'Assidah and Aden, the coast is almost wholly unknown to me, except from a distance ; there is no sea-cliff there, and not much on the maritime plain to interrupt the view from the sea to the base of the mountains after leaving the neighbourhood of Ras el 'Assidah. About sixty miles north-east of Aden the high land advances to within a few hundred yards of the shore, and affords a grand view from its rapid and almost uninterrupted descent from three, four, and six thousand feet to the plain below. The sea, too, just here, is vastly deep, and admits of close approach to the shore without danger.

Not more than twenty-five miles on from this, the seaward boundary of the mountains recedes from the direction of the coast, and stretching over to the Straits of Bāb el Mandeb, ends in the south-western extremity of the great elevated tract of Southern Arabia, while the coast, continuing on in its original course some miles further, before it takes a similar turn, leaves a triangular plain, at the apex of which is

the town of Aden, situated in the crater of an extinguished volcano, the sides of which reach about 1700 feet above the level of the sea. This crater opens towards the east, and presents a tail of peaks, ridges, and low cones, in the opposite direction, the whole of which amount to about six miles in extent.

I had not an opportunity of examining much of this mass of volcanic rocks, but I could see that they were principally composed of basalt, pierced with dykes of the same material, in a more compact state. The external side of the crater is more or less scarped, and separated from the high peaks and ridges which flow from it, and in this scarped portion may be seen lines of horizontal stratification: also some distance up the side of the slope which descends towards Back Bay may be seen a a small series of strata, consisting of pisolitic peperino, cemented together with glassy crystallized gypsum, and from the manner in which the pieces of pumice, basalt, and obsidian of which it is composed are arranged, together with the fact of the cement being sulphate of lime, leaves no doubt that it was deposited in the sea, and afterwards raised to its present position; at one part it is at least 200 feet above the level of the sea, though it descends to the water's edge in another. The stratification of the walls of the crater, which is very high up, would also lead us to the conclusion that the greater part of this igneous mass has been poured out under the sea, and has been gradually raised to its present height.

Through the kindness of Dr. Malcolmson, whose name I have already had occasion to mention, and who resided at Aden for some time, I am in possession of specimens of all the rocks and minerals which this gentleman after a long search was enabled to collect; and, having been permitted to inspect his valuable assortment when at Aden, I am enabled to state that the igneous rocks of this peninsula consist of basalt in almost all its forms, compact, black, grey, peridotic; rough, cellular, scoriaceous, variolitic; tephrine, with small crystals of glassy felspar, which forms some of the high peaks in the interior of the crater; leucostine, which forms part of the lavigenous effusions in the north-west part of the peninsula, where the last vents of the volcano appear to have existed; pumite and stigmite, simple, variolitic, and pisolitic, which form small deposits in various parts of the general mass, and semiopal and calcedonies, which abound in the island of Sira, opposite the opening of the crater.* To these may be added brown carbonate of lime, in columnar stratified crystalline deposits, with transverse wavy lines;

* For the characters of the rocks here mentioned see Brongniart's classification, Art. "Roches," Dict. des Scien. Natur.

massive and fibrous gypsum; and fluor spar, in minute crystals of an amethystine color, on the surface of calcedonies.

The recent littoral deposit here, as elsewhere on this coast, appears in several parts of the north-west part of the peninsula, raised fifteen or more feet above the level of the sea.

About four miles west of Aden there is another group of volcanic rocks, said to be partly composed of granite, and their peaked forms would indicate this; it is about the same size as Aden. Last of all on this coast comes the small dark group, probably also of igneous origin, which forms the eastern promontory of the Straits of Bāb el Mandeb.

Having thus come to the termination of the South-east Coast of Arabia, let us now pass over to the African Coast; and, commencing from Berbera, which bears nearly due south of Aden, see if the rocks extending from this part eastward to Socotra have any resemblance to those on the coast we have just left.

Personally I know nothing of this coast, but Lieutenant Grieve, who surveyed a good part of it between Berbera and Guardafui, kindly collected specimens for me from the principal headlands between Berbera and Ras Sărai, and from all the islands excepting Socotra.

From these, and the observations which accompanied them, it appears that the top of the bluff at Syara, which is 300 feet high, and about eighteen miles east of Berbera, is composed of a coarse heavy sub-saccharoid magnesian limestone, effervescing very feebly with acids, and of a reddish color, and ferruginous aspect; while the base is composed of the same kind of rock, but of a greyish brown color: both are without any appearance of fossils.

The top of a hill on the coast seven miles further on is composed of a fine compact limestone, of a yellowish white color, breaking with a smooth conchoidal fracture.

That of Hamarah bluff, which is 500 feet high, and twelve miles further on, of a fine compact sub-cellular limestone, of a cream color, mottled with spots of red and white, with frosted cavities of calc-spar; also effervescing slowly with acids.

The top of Ras Khanzir, about 200 feet high, and seven miles further, of a fine compact limestone, of a yellowish color, like that of the hill on the coast seven miles from Syara. Some portions appear, from their veined structure, and opaque appearance, to have been exposed to volcanic influence. There is another portion from this cape, too, which, from its open structure and fossiliferous composition, is evidently of a later formation, and resembles much the modern deposit at Makalla. It has in like manner been exposed to heat, and its cavities and

fossils are more or less soldered together by an amorphous white crytallization of carbonate of lime.

The next specimen is from the hills near Ras Shalla, fifty miles further on. This is a compact limestone, of a pinkish color, and uniform structure, breaking with an even granular fracture.

Hais Bluff, 500 feet high, and fifteen miles further on, affords a compact heavy limestone, of a granular sparkling structure, and a greyish brown color. It is highly magnesian, scarcely effervesces with acids, and closely resembles that of the base of the white limestone cliff on the east side of the Fartak range. Hais Island, close to this bluff, is 300 feet high, and composed of a sparkling, black green amphibolite, fissile, laminated, and very much resembling gneiss, but serpentiniferous at the joints, and closely allied to the sparkling hornblende rock of Ras Jazirăh, on the South-east Coast of Arabia.

Meyt or Burnt Island, about twenty-six miles further on, and seven miles off shore, yields a pegmatite in composition, but not graphic in structure, and a compact limestone of a fine uniform saccharoid structure, and grey color, effervescing feebly with acids. This yields by a rough analysis 15.32 per cent. of magnesia, and its specific gravity is 2.775 : it is a dolomite.

In the Museum of the Bombay Asiatic Society are specimens of limestone from Mărriyah, two hundred miles further east, and forty-five miles west of Guardafui. They were presented by Lieut. Cruttenden, of the Indian Navy, and are of a cream color, and compact fine structure, identical with the limestone on the top of the granite peaks at Makalla.

From this place we pass on to the islands between Cape Guardafui and Socotra, the first of which is Abd el Kuri, from which Lieut. Grieve sent me specimens, as well as from the islands called Kal Farun, and "The Brothers," situated between it and Socotra.

The summit of Abd ul Kuri is 1600 feet high, and composed of a fine white compact limestone, breaking with a smooth conchoidal fracture, dry, and opaque, as if it had been exposed to heat; and the lower hills, which are from 200 to 400 feet high, yield grey and red granite; fine and coarse-grained diorite, composed of black hornblende and whitish semi-transparent felspar, ophiolitic diorite, and euphotide; indeed all the kinds of igneous rocks that we have seen on the Arabian coast north of Marbat.

There is also a coarse, compact, sub-cellular, and sub-saccharoid limestone, of a light cream color, which comes from the higher parts of this island; it probably overlies the igneous rocks, and owes its color to the

action of heat; otherwise in structure it is just like the upper stratum of the low cliff in the Bay of El Kammar, and the dark brown limestone of the shores of Dofar.

The island of Kal Farun, fifteen miles north of Abd el Kuri, seems to be entirely composed of sulphate of lime. One specimen, coming from a height of 400 feet, is massive, compact, sub-saccharoid, and of a brown color; the other, which comes from high-water-mark, is earthy, white, and contains moulds of small shells, with particles of igneous rocks.

Turning to "The Brothers," which lie between Abd el Kuri and Socotra, we find the largest, or westernmost of these two islands, to present pink granite rocks, 1000 feet high, with limestone above them, reaching in all to 1600 feet; also diorite, as at Abd el Kuri; and a white compact limestone conglomerate, raised 300 feet high. The latter consists of small rounded gravel, shells, and corals, which have been firmly cemented together, and more or less opalized, probably by heat; while the same kind of conglomerate, with a few particles of igneous rocks, exists at high-water-mark in the easternmost island, still possessing its original loose, dull, and recently-formed appearance.

Of Socotra I know nothing more than can be gleaned from the late Captain Wellsted's account of this island, (Jour. Roy. Geograph. Soc. vol. v. 1835.) In the vicinity of Tamarinda, a town situated towards the centre of the northern coast of the island, there are granite mountains, 5000 feet high by measurement. "Connected with the granite range, and extending form north to south, a lower range is found, averaging in height about 1900 feet, and composed of a compact cream-colored primitive [?] limestone. From this the hills diverge in short ranges to the sea-shore, their outline being mostly smooth, with table summits and rounded sides, except those nearest the sea, which mostly present a steep wall. The whole of the hills in the western part of the island are similar in their appearance, elevation, and construction."

In the neighbourhood of Goobet Koorma the limestone appeared to be borne up upon the granite, and the line of junction between the two was seen 3000 feet above the place where Captain Wellsted stood.

Syenite, porphyry, and trap, were seen in different parts of the island, and the soil of the mountains is clayey, stiff, and of a red color.

Returning to the Somali coast, it is stated, that after a short but variable distance in-shore, the land from Berbera to Cape Guardafui is raised to a height averaging between four and seven thousand feet, and attaining its maximum elevation midway between these two places. It is composed of limestone, and the specimens I have seen from it have been more or

less fine and compact in structure, and of grey and white colors, similar in every respect to the limestone of the elevated tract on the South-east Coast of Arabia; while the cream-colored limestone in like manner seems to come from the tops of the lower hills, where it is probably in closer proximity with the igneous rocks.

Thus we see that the same kind of igneous rocks, and the same kind of limestones, exist on this part of the coast of Africa and its adjoining islands, as are found on the South-eastern Coast of Arabia and its adjoining islands; the same kinds of magnesian limestone, and a modern formation, corresponding to our miliolitic deposit.

There is also a spheroidal concretion of magnesian limestone, about the size of a walnut, which Lieutenant Grieve sent me from the coast of Africa, similar in every respect to that which has already been described as existing in the course of the hot spring near Makalla.

This concludes all that I have to offer on the geology of the North-east Coast of Arabia without the Persian Gulf, the South-east Coast and its adjoining islands, and the Somali or North-eastern Coast of Africa and its adjoining islands. Let us now briefly review what has been stated respecting the South-east Coast of Arabia.

The first thing that strikes us here is the continuity of the white limestone formation, which we may reasonably infer to be the same from one end to the other, a distance of 1125 miles; secondly, the eruption of igneous rocks along the great line of fracture, or fault, which forms the coast; and, lastly, the elevation of the land from four to six thousand feet above the level of the sea, which has brought into view other formations, lying beneath the white limestone.

Turning our attention first to the igneous rocks, we find that they comprise all the principal kinds, and probably most of the varieties, included under this denomination; and that by far the greater part of them are hypogene, (Lyell,) the rest volcanic. The presence of gneissic strata in the granite at Marbat also shows that some of this rock is at least secondary; and being mixed up with limestone in the same neighbourhood, identical but for the changes which such formations undergo when similarly situated, with some of the white limestone series above, further shows that there is granite here, which may be of still later date even than that enveloping the gneiss. The gneiss itself *in situ* I did not see.

We have also witnessed the dioritic and euphotide rocks, which prevail on the north-eastern third of the coast, enveloping jaspideous strata at Masira and Ras Jibsh; at the same time we have seen nummulitic strata resting on them at Mäskat and Masira, but in no instance have

we observed either the granite or the dioritic rocks overlying the white limestone series; while on the south-western third of the coast we have seen a chain of volcanic vents up to Aden, inclusive, pierced through everything, and an issue of black basalt and other volcanic rocks from them, which have overflowed the maritime plain in different places to a great extent. What the nature of the igneous rock may be at Ras Shuamiyah I know not, having only seen it from the sea.

Lastly, we have observed that the original localities of eruption of igneous rocks on this coast appear to have been the principal ones of the subsequent eruptions, with the exception of the volcanic rocks, which have come to the earth's surface, where the older igneous rocks do not appear.

Let us now go to the aqueous formations, and these we may separate into three *Groups*, viz., 1st, the strata of which the highest scarps are composed; 2nd, those of the compact littoral deposit on the shores of Dofar; and, 3rd, the loose, or miliolitic deposit.

1*st Group*.—This admits of three divisions.

The first or uppermost includes the white limestone series, which extends from the summit of the table-land to the commencement of the colored argillaceous strata. This consists, from above downwards, of compact white limestone, more or less composed of the remains of minute and small Foraminifera, with here and there concretionary flints, ex. gr. Mäskat, Masira, Hammar el Nafur, Ras Kariat, and Ras Shaherbataht; and that the flints also occur in the summit of the table-land above Marbat may be inferred from their presence in the talus beneath, separate, or combined with pieces of the limestone in which they were imbedded; also generally throughout this coast, from their presence at Resut, the beach in the Bay of El Kammar, and the cliff at Ras Darjah. Below, this passes into a soft white limestone, and then into a gritty loose chalky or sandy deposit, becoming more or less argillaceous towards its lower part, at Mäskat, Masira, Hammar el Nafur, and Ras Kariat, where it presents nummulites; also at Ras Shaherbataht, Jibal Jinjäri, Marbat, and Ras Hammar, (the argillaceous pipe-strata,) and Ras Sejär, (the *khat* or chalk on the summit of the cape,) where the existence of nummulites has not been determined. Then follows a deposit of clay of a greenish white color, at Hammar el Nafur and Ras Kariat; also at Masira, where it is colored dark green and red, while at Mäskat it is replaced by a siliceous sandy conglomerate. (Mäskat is included here for the sake of comparison.)

Here, then, we have a distinct, though little series, passing from pure calcareous material above to pure clay below, with siliceous matter between; and in this series we have at Mäskat, Masira, Hammar el

Nafur, and Ras Kariat, the presence of nummulites; while the existence of the so-called chalky stratum and flints in the more elevated and inaccessible parts of this coast would lead us to infer that the same little series existed there also, though as yet it has not been explored for nummulites. The presence also of nummulites (?) and orbitoides in the cliff at Takah, which is but an unraised portion of the great limestone formation, further favors the inference; and with this evidence of the existence of this little series on the high land of Southern Arabia we must be content until further observation can prove it more satisfactorily.

The presence of the clay here, too, not only serves to mark a subdivision in the white limestone series, but also seems to point out the time in its formation when the dioritic and euphotide rocks were erupted, as well as the origin of the clay itself; for from the strata in which the nummulites are imbedded having been deposited after the eruption of these rocks, as seen at Mäskat and Masira, and also after the deposit of the clay, as seen in the white limestone series at Hammar el Nafur and Ras Kariat, taken in connection with the change in the nature of the sediment in the latter, just preceding the appearance of the nummulites, it is plain that an eruption did take place about this time, affording the material of which the clay is composed, for had this not been the case the formation of the white limestone strata would have gone on uninterruptedly to the pure deposit above the nummulites. Hence we also see that this may actually be the case in places to which the material composing the clay might not have extended, and there the nummulites alone, or their allied fossils, must mark the upper division of the white limestone series. That this eruption was that of the dioritic and euphotide rocks may also be reasonably inferred from the nummulites overlying the latter, as well as the clay of the white limestone strata; and from their having been deposited in both places, just about the time the disturbance had become quieted, the remains of marine animals had begun to accumulate, and the siliceous material was beginning to disappear. The depth of this little series, overlying both the limestone strata and the igneous rocks, also seems to correspond, and this led to my remarking in my observations on the igneous rocks of Mäskat, (loc. cit. p. 126,) that the Nummulitic Series appeared much thinner at Mäskat than in many parts of the South-east Coast of Arabia. Let us now see whether there is anything to make us think that this is a fact, and that the great mass of white limestone strata, upwards of 1500 feet thick, which underlies the clay there, is but a continuation of the Nummulitic Series.

I have stated, p. 42, that impressions of Orbitolites exist in the marl

which passes into this clay at Hammar el Nafur and Ras Kariat; also that a spheroidal Alveolina in company with large Orbitolites and an Operculina abounds in the white limestone series at Marbat, and that this is exactly the case in a part of the Nummulitic Series (?) in the Hala range of mountains, near the Buran River, in Lower Sindh. Lieutenant Grieve also sent me specimens of white limestone from the summit of the table-land at Marbat, which contain numbers of Alveolina. Now the presence in this marl of Orbitolites which we have seen to increase, and that of the specimens of Alveolina with Foraminiferous tests generally which we have seen to decrease in number as we descend the white limestone series, seems to point out, that where these fossils commence to appear and the latter is most numerous, is the passage from the nummulitiferous strata into the inferior sub-division of the white limestone series, or orbitolitiferous strata; more properly termed perhaps alveolitiferous strata, for, plentiful as we have seen specimens of Alveolina in the white limestone strata at Marbat, they are probably much more plentiful in it in other parts of the coast, since they are so abundant in a part of the Nummulitic Series in Lower Sindh that there whole strata almost are made up of them, while in Arabia we have also seen them exist from the summit of the table-land (at Marbat) to the base of the white limestone cliff (at Fartak), though probably largest and most abundant between the two; at the same time we have observed the Orbitolites to reach their maximum density in the colored argillaceous series, which therefore more particularly deserves the term of orbitolitiferous strata. But, call these strata what we will, the point in question here is whether or not the whole of the white limestone belongs to the Nummulitic Series, and this must be left for future exploration to determine: all that can be deduced from the previous observations is, that the same kinds of fossils are to be found together in the talus of the great limestone scarp at Marbat as are found in the nummulitic limestone of Lower Sindh, and that the presence of Orbitolites with them seems to point out that they come from strata below the green clay, and therefore from the lower division of the white limestone series. I regret that I cannot state more of this sub-division than that the strata of which it is composed chiefly consist of fine white compact limestone, breaking with a smooth conchoidal fracture, more or less lithographic in structure, and of different shades of white and grey colors; it is generally scarped and inaccessible. At Fartak, we have seen that the lowermost of these strata are more or less magnesian, and in some parts dolomitic; but this, which we have frequently observed in this series on other parts of the coast, seems to be owing to local causes.

We now arrive at the second division of the *Group*, which comprises the colored argillaceous series, and this we have estimated at 300 feet at Marbat, 175 feet at Ras Sejăr, and 1000—1200 feet at Ras Fartak.* We have also observed it to consist of red, blue, green, and yellow argillaceous strata, sandy shales, and impure limestones, in which a red color is most predominant; and to contain, in addition to Orbitolites, throughout, but most numerous in the lower part, species of Echinodermata, Isocardium, Pecten, Exogyra, Ostrea and Ammonites, probably all of the cretaceous age: hence, if we consider the whole of the foregoing division as belonging to the Nummulitic Series, or Lower Eocene, this division must here be considered as the upper member of the Cretaceous period.

The third and last division of this group is the micaceous sandstone, of which we have seen so little that all that can be stated is that it is of great thickness, and, though laminated in some places, is for the most part massive throughout. As before observed, it fines upwards as it passes into the argillaceous division, and becomes coarser towards the bottom, where the gritty particles of which it is chiefly composed are evident to the naked eye. At Marbat it is mostly of a ferruginous yellow ochreous color, and at Ras Sejăr its upper part, which is the only portion of it exposed, is of a light greenish blue color, and veined with white quartz.

2nd Group.

We now come to the *2nd Group*, which we have seen best developed between Marbat and Resut. It consists of two kinds of limestone, both of which are more or less coarse and compact; the upper one is also more or less impure, shelly, and of a reddish white color, and the under one of a dark brown color, containing here and there pebbles of the older limestone formation, and particles of igneous rocks. Both together do not occupy a thickness of more than 50 feet at the utmost, and no part of this little group that I saw is raised more than 100 feet above the level of the sea. It rests on the compact limestone of the Nummulitic Series, and is chiefly characterized by the dark brown color of the lower stratum, and its extreme cragginess where exposed to the action of the waves.

We must be content with the mineralogical characters alone of this *Group* for its separation from the others, since the few fossils obtained

* Almost all the heights and thicknesses given, with the exception of those stated to have been computed by trigonometrical measurement, have been assumed, or obtained in a rough way, for as these observations formed no part of the survey, the means of making them accurately were of course very limited.

from it are too imperfect to be of any service in this respect. From the *1st Group* it is easily distinguished by its superposition, and the presence of pebbles of the older limestone; and from the *3rd Group* it is distinguished by its compactness, and the thoroughly fossilized state of its organic remains, together with its inferior position. My impression is that it belongs to the Older Pliocene age.

3rd Group.

Lastly comes the *3rd Group*, or miliolitic deposit, which is chiefly characterized by its loose structure. In its purest state, as at Ras Abu Ashrin, that is where it is not mixed with coarse littoral debris of shells, or aqueous or igneous rocks, we have seen it to be composed of minute grains of calcareous matter, with which is mixed a small quantity of hyaline quartz; the former being nothing more than the tests of microscopic Foraminifera, loosely cemented together by a partial dissolution and re-crystallization of the external parts of their shells. The purity and whiteness of this deposit is of course in proportion to the distance it has been formed from the shore, or the neighbourhood of coarse loose material; hence, in addition to the locality mentioned, it is very pure in the plain of Dofar, on the western side of Ras Sejăr, and in the sandy plains on each side the port of Kashn, while in most other parts we have seen it mixed with large shells, pieces of coral, and rocks of the neighbourhood. Perhaps 100 feet is about its average thickness. It exists at various degrees of elevation, from 15 to 150 feet high, throughout the coast, and the fact of its having been raised up at one place, viz. on Jibal Ghara, at Makalla, to the height of 1300 feet, seems to point out that it does not belong to the *Recent* deposits, though probably to the Post Pliocene formations. At Resut it is found filling the lithodomous excavations in the coarse shelly limestone of the *2nd Group*, and there also it contains oyster shells of the same species as those of a recent bed close by. At Marbat, where it fills the fissures of the granite plain, it contains a number of shells and corals, many of which are very large, Hippopus, Ostrea, &c. One species of the latter is perhaps the largest known: it exceeds in size *Ostrea latissima*, (Desh.) We have also seen that it is not only met with throughout this coast, but that it extends to the peninsula of Kattyawar, in India, from whence it is imported at Bombay for building stone; and from forming the lower part of the Desert of Akhāf, opposite Masira, it may perhaps be continued into the heart of Arabia. It is also this deposit which, from its modern appearance, and elevation above the sea at different places, forces upon our attention the gradual elevation of the whole coast; not less so, however, than the *recent* deposit itself, which, though less

striking, may be seen in many parts above high-water-mark; but these limited elevations sink into insignificance when considered with the extent of elevation and depression which the cracked sandstone at Marbat proves this coast to have already undergone.

From the foregoing data, then, and in the absence of more extended and precise information, we obtain the following table of the aqueous strata on the South-east Coast of Arabia:—

POST-PLIOCENE ? *Miliolitic Deposit*, 100 feet ?	Loose granular deposit of white calcareous particles, chiefly consisting of the remains of microscopic Foraminifera; with which is mixed a variable quantity of colored siliceous particles of igneous rocks, and, in some places, shells, corals, and rounded pebbles of the neighbouring formations, far exceeding in proportion the finer material; shells and corals more or less loosely imbedded in the latter, and retaining, for the most part, their original whiteness and structure.
OLDER PLIOCENE ? 50 feet ?	Coarse, compact, whitish limestone, more or less mixed with red argillaceous earth, containing shells and corals, resting on a brown compact limestone, imbedding pebbles of the older calcareous formations, and rounded gravel of igneous rocks in the locality; shells and corals more or less consolidated with the rock, and for the most part deprived of their original whiteness and structure.
LOWER EOCENE ? 2000 feet ?	*Upper Division.*—Consisting of fine compact white limestone, with concretionary flints, the former more or less composed of the remains of small and microscopic Foraminifera; a soft calcareous limestone or grit, with Nummulites; and a stratum of greenish white marl and clay, with impressions of Orbitolites. *Lower Division.*—Fine compact limestone strata, more or less lithographic in structure, of different shades of grey and white, containing large Orbitolites and Foraminifera of the genus Alveolina, together with fossils of the Nummulitic Series.
CRETACEOUS PERIOD. 1000 feet ?	Argillaceous strata, composed of impure limestones, clays, and shales, of different colors, principally red, richly charged with small Orbitolites, and containing Echinodermata of the genera Discoidea, Pygaster, Diadema, and Salenia; Pecten,* Ostrea, *Exogyra flabellata*, &c. and Ammonites.
1700 feet ?	Compact micaceous sandstone.

* For "*Pecten quinquecostatus*, Sow. mihi," p. 74, read "Pecten.—1st *Species*?" and, in the same paragraph, for "three broader ones" read "two broader ones."

Such is a faint outline of the Geology of the South-east Coast of Arabia; the few fossils collected from whence will, I trust, sooner or later reach the Geological Society of London, where they will meet with that attention which they deserve. I have given some of their characters here for local reference, but we must look for more useful and authentic descriptions of them from a higher source.

ART. IV.—*Observations on three Copperplate Charters, granted respectively* A. D. 933, A. D. 1261, *and* A. D. 1391, *with Facsimiles, Transcripts, and Translations.* By MAJOR GEORGE LEGRAND JACOB.

Communicated by Government.

No. 1, *of* A. D. 933.—This records the grant, in the Sháliváhan year 855, by a Sovereign of the Yadu race, Govindráj, of the village Lohagrám, in the district of Rámpur,* to Keshava Dikshit, son of a Bráhman fellow-student. The language is pure Sanskrit, but inflated with gigantic hyperbole, puerile conceits, and far-fetched metaphors, containing little matter to compensate the labor of digging out the meaning.

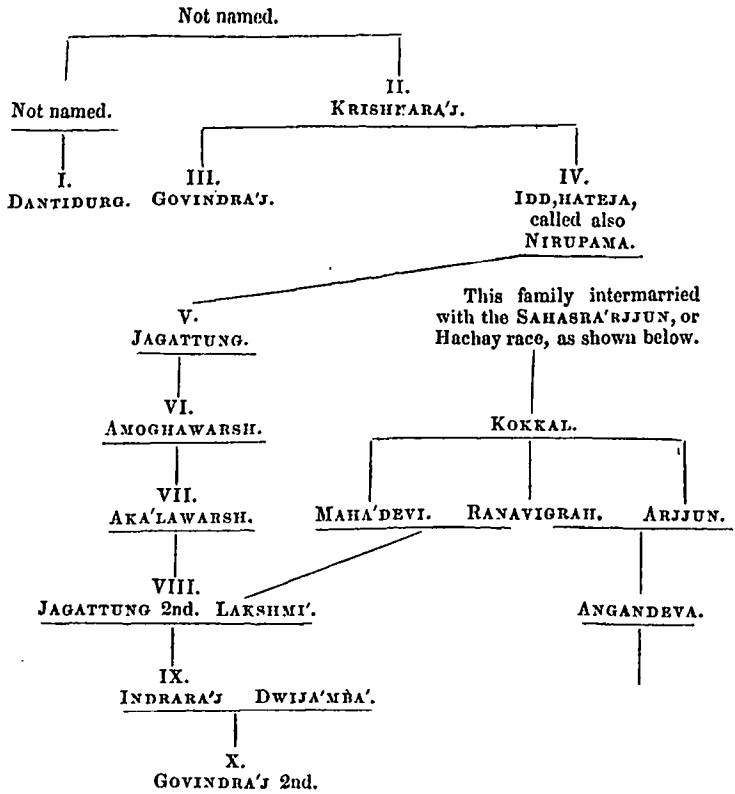
The plates belong to a Bráhman family, residing near Sánglí, but to what quarter the grant may pertain I know not. The seven places recorded may help to fix this: 1st, Lohagrám, the village given away; 2nd, Rámpur, the "Táluká," the four villages bounding the grant, viz:—

Ghodégrám,
Vajulí,
Vinchaviharabh,
Sonnahí,

and lastly, Púndawarddhan, the birth-place of the grantee. From a passage alluding to the Ganges and Jamná as "watering his kingdom," the Yadu sovereignty at this era must have been more extensive than is generally supposed.

The following genealogical tree is gathered from the plates, and it will serve to clear up doubts left by previous inscriptions. It differs little from Bál Gángádhar Shástrí's attempt to reconcile his and Mr. Wathen's notices published in the Transactions of the Bombay Branch Rl. As. Society, No. V. April 1843, page 213. The Roman figures give the order of succession:—

* Called Rámpúri Sapta shat, or Rámpur of the seven hundred (villages probably).



Donor of the grant is called also Suwarnawarsh, and Wallab,h Narendra Deva.

The senior name of the race, second in succession to the Gadí, is described as having overthrown the Chalukyas, the reigning tribe celebrated in the Nerur plates.* Supposing the ten reigns to average fifteen years, which, as the fourth Ráj was a first cousin to the first, will be nearer the mark than the higher average generally assumed, this would give the year A. D. 783 as the period of the overthrow of the Chalukyá dynasty by the Yadu.

No. 2, *of* A. D. 1261.—This inscription shows the Chalukyas again in the ascendant, and reigning at "Kalyán," Kanudeva the King.† His Minister, Keshava Mahájaní, bestows the village Tereovatak, the modern Terwan, in the Rajapur taluka, on certain Bráhmans and

* See Vol. VI. of the Society's Journal, pp. 203, *seq.*

† Boasting also four other high-sounding names.

the deity Vimaleshwar, the latter said still to enjoy his portion. The Sanskrit is not grammatical; the character approaches much nearer to the modern type: the inscription is probably the same of which an imperfect copy and translation are given in Vol. V. Rl. As. Soc. Journal, page 177.

No. 3, *of* A. D. 1391 is an interesting relic of the Bíjánagar dynasty, founded, according to Ferishta, in A. D. 1344, by Bilál Deu, Raja of the Carnatic, who named it after his son Bíjá.* I regret not having Wilks to refer to. Hamilton, quoting him and other authorities, dates the commencement of this city A. D. 1336, and completion A. D. 1343, by "Aka Huryhur and Burra Huryhur, and their Minister the learned Mádhava Acharya." This inscription gives only the following genealogy:—

ACH YU'T, married to Shrí.

|

BUKKARA'J.

|

HARIHAR.

The first named is not spoken of as a sovereign, but the second is. The discrepancy between all three—Ferishta, Hamilton, and the plates —remains to be cleared up, but there would evidently seem an error in attributing the foundation of Vijaya to the parties named; for, supposing another and previous Harihar, there would scarcely have been another and powerful Mádhawa: this person is celebrated in Sanskrit writings as the Minister of the Bukkáná race, which, supposing him to retain office under the son, agrees with this genealogy. His different names, according to the Shástrí, who is my authority on this point, are Mádhava Acharya, and Chatur Vedáchárya. Later in life he forsook mundane affairs, turned Sunyásí, and received the name of Vidyáranya.† This inscription, alluding to Vijaya, says that Bukkaráj here lived as an Indra, defying all his enemies; and as no mention is made of Achyut's deeds or residence, the inference is that Bukkaráj was the first of the race who established himself in power in this quarter. Harihar is described as ruling over the whole of the Indian peninsula that is washed by the ocean, and it seems doubtful whether supremacy to the Indus be not claimed. His Prime Minister, the aforesaid Mádhava, whom he invested with the sovereignty of Jayantipúr,

* Properly Vijayanagar, the City of Victory, called in this inscription Wijayá only.

† His works are said to be, Adhikarana Vijayá-Mala, Kúla Madhawa, Paráshara Mádhava, and several others much prized.

conquered Goa from the Turushkas (Turks), and re-established there the worship of the ancient idols, which they had uprooted. This victorious personage, before transferring control over the Goa country to another Minister, named Narahari, granted to the parties named in the plates the village of Kuchchar, called also Mádhavapur: this village, the modern Kochré, is not many miles from the present Goa frontier, Sawánt Wadí.

G. LEG. JACOB,
Political Superintendent, Sáwant Wádí.

16*th November* 1849.

No. I.

PLATE DATED SHA'LIWAHANA SHAK 855, A. D. 933.

Free Translation, but as close to the Sanskrit as the language will admit of.

The melodious Sámved songs, in which Saraswatí* takes delight, sung by Brahmá, pleased with the creation of the universe, continue in honor. From the moon, that swan sitting on the lotus of the cerulean lake, surrounded by a numerous train of star-like lotuses—that silvery parasol of the great king Kám,† whose unrivalled sway prevails throughout the creation—that milky ocean in beauty—that silvery mountain in resplendence—that ivory comb of the Goddess‡ who rules over the Eastern quarter—that mansion of universal beauty, there sprung a race whence issued forth on earth an ocean-like branch of Yadus, the abode of riches and fame, the theatre of policy, prosperity, and deep meditation, beneficent, and renowned for protecting the poor. In this cloudless heaven rose Dantidurg, skilled in arts,‖ to whom his host of enemies were submissive as the starry spheres to the moon, the abundant and extensive rays of whose fame, like those of the moon's white light, filled all quarters.§ His illustrious son-like paternal uncle, Krishna Ráj, having ascended the heroes' ancient, Meru's crest-like throne, dispelled the dark and insolent Chalukya race, and sent forth as the sun does when first rising over the mountain tops, the light of his power over other kings,¶ and diffused his glory throughout the world. His son, Govindráj, born at Indubimbashilátal, orna-

* The Indian muse. † The Hindú Cupid. ‡ Untranslatable.

‖ Here is an untranslatable play upon words, founded on the double meaning of the adjective *kalawana*, "possessed of digits," and "possessed of arts," the former applicable to the moon and the latter to the king.

§ Also "gratified the hearts of mankind."

¶ The play upon the word आट्ट *atta*, signifying both "light" and "command," admits of no exact translation in English.

mented by a mark caused by the smoke of his burning enemies, came after him. He was succeeded by his illustrious younger brother, Idd,hatēja, also called Nirupam, who had a heroic and philanthropic heart, and whose dread made the progeny of his numerous enemies to tremble, and whose sway-tracing signet (Mudra) reached to the seas, hence known by the name of Samudra (with signet), which they still bear.* He was followed by his son Jagattung, whose rivals, bereft of their authority, had become as sapless and impotent as the withered breasts of old women. His son Amoghawarsh, who succeeded him, was of incomparable power.† His spotless fame so wide, that, filling up the whole universe, and finding no outlet, it ultimately overflowed in the form of water into the deep ocean of the world. Of him was born king Akálawarsh, to whom experienced shieldsmen, terrified by his prowess, instantly surrendered, throwing down their swords and bucklers. Mahádeví, an ornament of the Sahasrárjjun race,‡ the daughter of Kokkal, became his queen. Their son, king Jagattung, resembling Dharm (Ajatashatru) by having no enemies, but glorious for prowess, like Bhímasen and Arjjun,‖ was married to Lakshmí,§ the daughter of Kokkal's son Ranuvigraha, who was able to withstand his rival kings, deep, and holding, like the ocean, precious things. From the king Jagattung arose Lakshmí's son,¶ like the sun from the Udayachal,** glorious, flourishing, called another sun amongst the kings, and who truly deserved in this world the name of Indraráj,†† being one entitled to continual homage,‡‡ exterminating all iniquitous kings and their adherents by the thunderbolt of his prowess.‖‖ Dwijámbá (who like

* Here is a play on the word *Samudra*, signifying "seas" in one sense, and "with signet (or power)" in the other.

† A few words following are unintelligible.

‡ Afterwards also called Hachayá.

‖ Dharm, Bhímasen, and Arjjun, are the first three of the brothers called the "five Pándavas."

§ The metaphor is constructed by comparing this princess to Lakshmí, the wife of Vishnu, the goddess of wealth, and also the first of the fourteen precious things produced by the ocean, when it was churned by the gods and giants.

¶ The play upon the words *Lakshmyáh nandanah* signifies as above given in one sense, and "supporter of splendour" in the other.

** The name of the mountain behind which the heavenly bodies are supposed to rise.

†† The metaphor is constructed by comparing this king with Indra, the chief deity (quite a Jupiter Tonans), supposed to have punished the flying mountains by scorching up their wings with his thunderbolts.

‡‡ The play upon the term *Animisha-darshana-yogyah* signifies as given above in one sense, and "fit for the visits of the divinities" in the other.

‖‖ Here is another play upon the term *sthiti-chalita-sakala-bhúbhritpakshach-*

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Lakshmí from the ocean, or like Párwatí from the Himálayás, the lord of the mountains, was born from Angandeva, very strong in force, the son of Arjjun, who became by his virtues the senior son of the aforementioned Kokkal, who was a descendant of the Haihaya race that broke down the pride of Ráwan) became Queen of Indraráj. Their son Govindráj, who surpassed Kám in beauty, who never committed wicked deeds, although with full opportunity, who never dishonored the elders, nor brought disgrace on himself by perpetrating evil actions, such as going with a brother's wife, &c., nor ever acted the coward's part by assuming derangement to cloak misdeeds, who signalized himself in the world as adventurous only in charity and war, became the next king. He poured forth bounties like rain upon his people, so that he at last was said to have inundated the whole creation with gold. The earth, finding herself rid of her wicked rulers at the height of his triumph over the world, commenced to dance for joy, raising, as if to gesticulate, her hands, the flapping banners of supremacy.* The sun and moon also, knowing that this victorious king does not bear with any insolent and inimical ruler,† became terrified, and submissively ran like heralds before him. Princes and authorities bowed themselves down before his ever-victorious palace, shining with his lustre, having its external gateway lofty, and shaped like the moon. Has it actually happened that the Ganges and Yamuná have poured themselves into and watered his kingdom because of its superiority over all others in virtue and genius? While this victorious king has been peaceably reigning, his virtuous kingdom has been freed from all enemies, and the expression "Vimána," an evil character, is understood only as a celestial vehicle,‡ to the truth of which parrots even bear testimony. The soot of the numerous fumes, rising from the fire of his great valour in battle, produced another heaven of azure clouds, in which the rays reflected whilst brandishing the glittering swords, are the flashes of lightning and the pearls‖ that drop in breaking the temples of the stubborn and hostile elephants, shine like the stars. His fame so pervades and saturates the universe, that the moon, the milky

ched-á-bhimukta-bhuja-wajrah, signifying as given above in one sense, and also "hurling out of his hand a thunderbolt to deprive all the flying mountains of their wings."

* Páli, called also Padhi, in some of the previously-translated plates.

† The words *Param mandaládhipam*, signifying as above, and also "other lord of circle (disk or system)," such as the sun and moon, a raja in his darbár, &c.; hence the allusion to the sun and moon lost in the translation.

‡ An untranslatable play upon the double meaning of the word *Vimána*.

‖ This metaphor is founded on the popular belief of the elephant's forehead containing a pearl.

ocean, and the thousand-headed snake, are the produce of its superfluity. It is no wonder that enemies succumbed to his authority when he desired to search out and exterminate all such,* for even the conscious lotus,† being terrified, but knowing its concealment under water still more dangerous, implored mercy, as it were, by offering Lakshmí to him out of its bud.‡ *The Pandanus odoratissimus* took, as if through fear, shelter in a valley, under a mist of its own odoriferous particles, scattered by the wind; but the jack-tree‖ and cane§ saved their lives by becoming vassals, and standing at the doors¶ of his palace. The king by his beauty rivalling that of Kám, has become another Nityakandarp,** thus deriding Mahádeva's third fiery eye, for having in vain burned up and made Kám "Anitya Kandarpa."†† He has been so richly blessed with energy, nursed by counsel and valour, the other two constituents of royal strength, that he thought little of even Indra's happiness. He, a second Brahmá amidst the Chánakyas,‡‡ a Naráyan,‖‖ on account of his being devoted to the welfare of the world, subjugated by his unparalleled valour, became also a Trinetra,§§ living as it were within the inimical breasts¶¶ that he had himself torn open with his plough. This blessed king of kings (independent, and ever most desirous of maintaining his supremacy, called Suwarnawarsh, and also for universal popularity Wallab,h Narendra Deva, *** constantly meditating on the feet of the prosperous and independent Nityawarshadeva, and a great teacher and a king of kings) orders all ministers, mánkarís,††† rulers of kingdoms and countries, principal

* Here is an untranslatable play upon the double meaning of the word *Kantaka*, which means "thorns" as well as "enemies."

† A particular species of red lotus, having thorns.

‡ Here is a play upon the word *kosha*, which means "a bud," and also "treasury"; Lakshmí dwells in both the lotus-bud and treasury.

‖ The jack-tree, though itself not thorny, bears a fruit covered with prickles.

§ Porters and mace-bearers generally stand with their canes at the doors, hence the allusion.

¶ Door frames are generally of jack-wood.

** That is, "everlasting or imperishable Kám."

†† That is "transitory or perishable Kám."

‡‡ May be perhaps the descendants of Chánakhya, the name of a sage, now applied to a man of prudence.

‖‖ That is, Vishnu.

§§ The Three-eyed, a title of Mahádeva.

¶¶ One of Shiva's epithets is *Smashanawási*, or "dweller in cemetery," hence this far-fetched metaphor.

*** This, signifying "the darling of kings," is the king's sixth epithet.

††† The persons entitled to certain honors and presents rendered at courts, councils, festivals, village-assemblies, &c.

villagers, respectable men, and all who are tenacious of their dignity. Be it well known unto you that the king, who with a view of promoting his own and his parents' virtue and fame by a long continuance of his capital, shielded by wise counsellers, even restores bygone grants to gods and Bráhmans, and who daily issues by hundreds innumerable edicts of village-grants, on Thursday, while the moon is in the mansion Púrwabhádrapada, the 15th of Shráwan [July, August], in the Samvatsar of Vijaya 855 years having passed of that era, has given in Inám, till the sun and moon endure, formally pouring water* from the hand, the village Lohagrám in Rámpurisaptashat, with all the trees thereon, exempt from payment of grain or gold,† and from the ingress of the military, to Keshava Dikshit, son of his fellow-student Dámodar Bhatta, born in the city of Pudawardhan, a descendant of Kaushik and a Kánwa‡ sectary. The undisputed boundaries of the village so granted as never to be coveted back, are, Ghodégrám on the east; Wajulí village on the south; Vinchaviharabh village on the west; and Sonanhí village on the north. No one should ever interfere with Keshava Dikshit, or his posterity, whilst they are cultivating or enjoying, or suffering the village to be cultivated or enjoyed. Future kings, either of my own or other lineage, who may know that wealth is as transient as the waves undulated by a hurricane, life as the summer clouds, and also that preserving an assignment of land is more meritorious than granting it, which is their common duty, should duly observe and protect this our grant. 'Rám has said "To give land, and thus build a bridge, to pass, as it were, over an ocean of sin, is a duty, common to rulers. But O! you future kings, to protect this bridge of charity from time to time is the repeated solicitation of your suppliant Rámchandra." It is also said that he who gives land abides sixty thousand years in heaven, but a resumer and an abettor in its resumption are doomed to pass the same number of years in hell. He who takes back land given either by himself or others, becomes a worm, and rots along with his ancestors in his own hell; charity given by a single handful,‖ or resumption of what is given, destroys the merit of all former donations. He that gives land dwells myriads of years in the heaven of Bramhá. Be there blessings throughout the creation. Be our salutation to Shiva.

* A practice observed at the time of making a donation, to intimate relinquishment of right over it.

† A few words following are unintelligible.

‡ A particular section of the Yajurved.

‖ Giving with a double handful is held meritorious by the Shástras.

No. II.

Translation of Plate, dated Shaka, 1182, a. d. 1261.

1182 years having passed of the blessed Shálivan era, Raudra being the current year, Saturday, the 7th of the fortnight of the waning moon of Paush (December, January).

He who has been honored with the title of the five great words, as Ráy, Dharaní, Waráharáy, Batkáraripuráy, Sáhus Malha, and Shrí Kánvadeva Ráy, residing in the best city of Kalyán, a descendant of a Kárn* in the Kaliyug, a sun causing the bud of the lotus-like Chálukya race to bloom, whose flag carries the golden boar, the ocean of truth,† a fulminating cage for sheltering refugees, a devout worshipper of Maheshwar,‡ lord of the empire gained by propitiating Mahádeva by devotion, a black bee sucking the mellifluous lotus-like feet of Shrí Kedárdeva, since the time of the accession to the throne of Kánvadeva, Keshava, surnamed Mahájani, has been the Minister. This noble statesman, who is pious, prudent, skilled in arts, whose advice is the head ornament of all great councillors, during the merit-giving time of the sun's entrance into Capricorn, has devoutly and spiritual-mindedly assigned the village of Terawátak,‖ which he had obtained by the favor of the Rájá, with trees, and other usually grant-accompanying things, together with all its produce, with power to punish crimes and correct morals within its boundaries, to Keshava Prabhu, of the Bháradwáj lineage, who is to supervise the eight sacerdotal duties,§ and to the following deity and other nineteen Bráhmans, pouring water on their hands, and issuing this edict to Goi Raul, son of Jálhun Rául. The land called Rhát Síwár,¶ enjoyed by the Shúdras, is assigned to the deity Vimaleshwar, and the land lying near the temple, to Mádhava Deva, of the Bháradwáj lineage, for the daily worship of, and offerings to the Deity. The remaining Bráhmans are,—3, Nágde Kramait, of the Bhárgava lineage; 4, Vithal Paishás, of the Káshyap race; 5,

* The name of the half brother to the Pándavas, famed for munificence.

† Or "a mine of precious truth."

‡ Mahádeva.

‖ Now called Terwan, near Rájápur Táluká, Vejedrug.

§ 1, sacrifices, &c; 2, consecration of gods, wells, gardens, &c. &c.; 3, the ceremonies closing and concluding long religious observances; 4, predicting eclipses, interpreting them, telling auspicious seasons for undertaking any work; 5, consulting the religious code of laws and institutes, and prescribing therefrom penances, &c.; 6, preaching the Puráns; 7, administering justice; 8, supervision of the religion of the country.

¶ Perhaps Bnat Síwár.

Vithal Paishás, of the Bhárgavá lineage; 6, Ukal Paishás, of the Bháradwáj lineage, on whom is bestowed the Bramhatara; 7, Govind Bhat, of the Gárgya lineage; 8, Somde Bhat, of the Atri lineage; 9, Somde Kramait, of the Vasishth lineage; 10, Keshava Bhat, of the Vasishth lineage; 11, Mádhava Bhat, of the Káshyap lineage; 12, Wasudeva Bhat, of the Mudugal lineage; 13, Paduman Bhat, of the Vásishth lineage; 14, Mádhava Bhat, of the Gárgya lineage; 15, Achyut Bhat, of the Atri lineage; 16, Wáman Bhat, of the Káshyap lineage; 17, Náráyan Bhat, of the Bháradwáj lineage; 18, Náráyan Thákur, of the Bháradwáj lineage (on whom the office of a Chaudharí, and of a protector of the village is bestowed); 19, Harideva Bhat, of the Bháradwáj lineage; 20, Tikal Bhat, of the Bhárgava race. Four orchards, called Karhátak, are assigned to the holy purpose of permanently supporting the Math,* which is provided with culinary copper vessels, and situated near the temple. Kings, descended either from the present or other ruling race of this country, must so piously preserve this village grant, as to become enjoyers themselves too of beatitude. Many kings, as Sagar and others, made land-grants, but whosoever is the lord of the land, to him belongs the merit of preservation thereof. The resumer of land given either by himself or others, passing sixty thousand years as a worm in hell, is born a wretched Chandál. He that seizes one tola of gold, or a cow, or a bit of land, even of a finger's breadth, is doomed to remain in hell till the annihilation of the elements. It is recorded that no poison should be named equal to the seizure of Bráhmanical property; for the former destroys merely the one that takes it, but the latter also one's posterity. To all future rulers, either of my or other race, who will preserve this my grant, I bow down. This is written by Govind, the auspicious Maheshwarí.

* The nearest word for this is perhaps "convent."

No. III.

Translation of Charter, dated Shaka, 1313, a. d. 1391.

Be our salutation to Mahádeva, over whom waves as a chowrie the lofty head-kissing moon, who is like the Múlastambha* for the erection of the universe. Be glory to the boar Vishnu, who came into existence of his own will, and on whose tusk the globe of the earth looks beautiful as a lotus flower on its tube-like pedicle. The gold mountain Meru rests elegantly on the flower-like globe as the pericarp of the lotus. Bhárat (India) and the other continental divisions form the petals of the globe. The seven mountains Kuláchal, &c. that surround the pericarp (Meru) are the stamens, which add to the beauty of this flower. India is one of the petals. In its southern half is situate the country of Karnátak, through which flows the well known and great river thereof, Tungabhadrá. Even its sacred banks are so efficacious as to burn up a forest of sins. On one of the banks is the place of the great god Virúpáksha.† This place is supposed to have the same degree of sacredness as the Ganges. In its vicinity stands the fortified and impregnable capital city Vijayá, where the females have lotus petal-like long eyes, and possess such exquisite beauty as to resuscitate and rouse up even Kám, burnt up by Mahádeva.‡ As a divine incarnation, in the family of Yadu, Bukkaráj‖ was born of Shrí, wife of Achyut. He was dreadful in war; he defied all his enemies, and lived here as an Indra (god of gods). His son Harihar,§ powerful as Indra, went forth to conquer the world. He is worthy of the name, for his name and virtues are the same as those of Vishnu and Shiva. He, whilst ruling the religion formed by the northern bank¶ of a river, heard of but not seen,** the Eastern sea, Ráma's pool, and the Western sea, the great Kings of all the world fall at his feet. By his order his

* The name of a particular stone column, carved, and its capital with various grotesque figures, erected before the undertaking of any structure.

† Now called Hampivirupáksha.

‡ The Indian Cupid, of whom it is related that one day when attempting to subdue Mahádeva, while absorbed in meditation, he was burnt up by the god's third fiery eye.

‖ Also called Bukkana.

§ Vishnu and Shiva.

¶ The original appears to include the river.

** Perhaps the river Indus, or Attak, which the Hindus are prohibited by their religious code to cross.

Prime Minister Mádhava* began to rule Jayantipur, the effects of whose sound policy are so admirable that his enemies, while living, enjoy not a moment's rest. His name resounds in every quarter. He, at the head of a large army, set out, with an intention of subduing countries. A capital, surrounded by a sea, in the Konkan, and bearing the name Goa, was environed by an ocean of his forces. This heroic Minister banished all the numerous Turashkas† infesting the country, and set up again Saptakotishwar, and the other ancient idols that had been rooted up and thrown away by them. But Harihar, there consulting with his Ministers, concluded that his empire would be of short duration if the Prime Minister were not in his own territory. He therefore recalled the Minister, and bestowed on him the throne of Jayantipur, of which he was now the anointed ruler. Another Minister, Narahari, a descendant of Attreya, and the son, by Amlika, of Bramharas, a Bráhman, well versed in the Vedas and Shástras, was sent out to Goapur in his room. Narahari's younger brother, Bháskar, is well known. Narahari, a king-like personage, reared up by the rain of ambrosial satisfaction, derived from the favor of benign knowledge, as it were a Shankar‡ and thus becoming a Kalpataru‖ to all the learned of his age. Fame, a bride, previous to her wedding with the Minister, presented the renown of all his enemies as the offering of Lahya (parched rice) to the sacred fire of his prowess: she sat on the marriage slab,§ then stepped upon the seven continents, and proceeded to the heavens, as if to visit and receive personally a blessing from Vasishtha's wife Arundhatí.¶ The happy and wealthy Mádhavaráj, the chief of great ministers, and the guide of spiritual worshippers, says: "On Wednesday, during the time of the solar eclipse, when charitable deeds are highly meritorious, in the month of Vaisháhkha (April and May) of the Shálivan current year Prajápati 1313, A. D. 1391, I assign, with the pouring of water into which gold has been dropped, as a religious endowment, the village

* The Hindu author who wrote a commentary on the Vedas and works on the laws and institutes of Manu, on theology, astronomy, physic, and other subjects, which are extant, and held in great estimation.

† The Pandit asserts that a tribe of Mahomedans, who had established themselves at Goa, were so called. The flesh-eating Turashkas are mentioned in a plate found near Attok, assigned to about the eighth century, in the collection published in Vol. VI. Rl. As. Soc. Journal, the word being translated "Turks."

‡ Name of Mahádeva, implying good doer.

‖ A fabulous tree, nourished by ambrosia, which yields whatever may be desired.

§ Or the crest of a mountain.

¶ A goddess of chastity. This metaphor is throughout founded on the practice of Vivahahoma, a ceremony essential at all weddings.

Kuchchár, called also Mádhavapur, in the country of the same name, Kuchchár, in twenty-five allotments, to twenty-four Bráhmans, who are well versed in the Vedas and Shástras. Their names and lineage are as follows: Two of the allotments, the first and twenty-fifth, are given to Damodar Bhat, son of Anant Bhat, a descendant of Bháradwáj; the latter is granted to him as supervisor over the other Bráhmans. 2nd, to the grandson of Mahádeva Bhat, and the son of Anant Bhat, a descendant of Vasishtha. 3rd, to Wasudeva Bhat, son of Narasinha Bhat, a descendant of Attreya. 4th, to Khán Bhat, son of Anant Bhat, a descendant of Bháradwáj. 5th, to Dámodar Bhat, son of Wasudeva Bhat, a descendant of Attreya. 6th, to Mahádeva Bhat, son of Naram Bhat, a descendant of Attreya. 7th, to Wáman Bhat, son of Mahádeva, a descendant of Jamadagni. 8th, to Rhám Bhat, son of Dámodar Bhat, a descendant of Attreya. 9th, to Kán Bhat, son of Anant Bhat, a descendant of Bháradwáj. 10th, to Paumnideva Bhat, son of Vithal Bhat, a descendant of Jamadagni Watsa. 11th, to Anant Bhat, son of Mahádeva Bhat, a descendant of Kutsa. 12th, to Anant Bhat, son of Keshava Bhat, a descendant of Jamadagni. 13th, to Janárdan Bhat, son of Govind Bhat, a descendant of Attreya. 14th, to Vishnu Bhat, son of Rámkrishna Bhat, a descendant of Jamadagni. 15th, to Hari Bhat, son of Dámodar, a descendant of Attreya. 16th, to Govind Bhat, son of Mandeshi, a descendant of Kaushik. 17th, to Wásudeva Bhat, son of Vithal Bhat, a descendant of Jamadagni. 18th, to Paumnideva Bhat, son of Govind Bhat, a descendant of Kaushik. 19th, to Mahádeva Bhat, son of Hari Bhat, a descendant of Jamadagni Vatsa. 20th, to Tán Bhat, son of Náráyan Bhat, a descendant of Vasishth. 21st, to Bhatam Bhat, son of Mahádeva Bhat, a descendant of Jamadagni Vatsa. 22nd, to Vithal Bhat, son of Námdeva Bhat, a descendant of Bháradwáj. 23rd, to Mahádeva Bhat, son of Wámdeva Bhat, a descendant of Bháradwáj. 24th, to Keshava Bhat, son of Govind Bhat, a descendant of Vasishtha.

The boundaries of the so-granted village Kuchchár, hence called Mádhavapur, are as follows: Pát lies to the East of it; a Banian tree and a stone, situate on the summit of the intervening hill, form the Eastern boundary line. Mhápan lies to the south; a salt marsh, by the name of Paragáti,* in the jungle, forms the Southern boundary-line, from which runs Westward the dam of a smaller marsh: near this is a ravine† on the breach of the sea; the sea lies exactly to the West.

* Now called Paragalwi.

† Also ditch, pit, deep hole, chasm.

Paraulya* lies to the North; the Paulot† and the creek beneath it, that runs to the sea, form the Northern boundary line. The grant of this village, with all its appendages, trees, water, treasure, if found, and everything thereon, is made by the consent of the king, his ministers, the chief men of the village, exempt from all sorts of taxation and oppression, to the above mentioned Bráhmans, who may undisturbedly enjoy it. To preserve what has been granted, a common duty incumbent on all kings, is like a bridge for their safety, over an ocean of sins. O you monarchs! preserve this bridge at all times, is the constant prayer of your supplicant Rámachandra. He who removes what is granted, either by himself or others, is doomed to pass sixty thousand years as a worm in hell.

* Now called Parule or Parole.

† We have no good English word for this useful term, signifying the line of any ridge or portion of land from which the water turns in opposite directions.

यस्मिं बृंटकास्ना वकाल्लुकमम श्रृं स्लाजकाल्लेरूय वदाम्र वंनकपल्लुकासवसूतिल्ल म्झीः कृतापायनंके
तक्षापतकोल्लयक्षिजनजः पुंजोंदकातादतदुराद्रूपनत्यमवदुलतयादार्यामसुद्रोस्तिंनायम्बसमु
पहसितहनयवदद्वनविहितानित्य कन्दर्पेनृपत्तोंदर्यदर्पः श्रुतिकृत्कन्दर्पः ।प्रदुमंठसकुरुपमैहि
तोसाहसकुसलाक्षिप्तसतमुदयसुवस्त्राएवदत्तर्मुदवः ।प्रथितैकविक्रमाक्रांतवसुंधनाहितकनणप
नायणः श्रीविक्रांतनारायणः ।स्वकनकलितहतिहलदक्षितदिपकूपकुंजलक्षेत्रः श्रीनृपतितणक्षः ।।
समरदक्षचपरमदारकमहाराजाधिराजपरमेश्वरश्रीमत्किरातदर्वदेवपादानुध्यातपरमदारक
कमहाराजाधिराजपरमेश्वरश्रीमदुवर्नुवर्वदेवपृथ्वीवल्लभश्रीमद्वल्लरुकलेंद्रदेवः कुशलीसर्वान्नि व
यतासंवरेमानकाकृष्णतिविषयपतिग्रामकूटमहत्तरयुक्तकापपुरुषकादिका
निकान्गादेसत्यवः संविदितंयथामानयतिवटनाजक्षेत्रीस्तिनतनवस्त्रोत्तनमाता
पित्रोरात्मनश्चपुण्ययशोभिवृद्धयेत्रर्क्षेत्रुक्षानपिदक्षेत्रोनाग्रहारान्नृतिपालय
तात्रतिदेवंचकिंनवदितमस्यग्रामस्यासनाविम्रतस्तः प्रयच्छतामकनकालातीतसंवत्सर
मतक्षत्रसुपंचपंचाशदधिकेष्वेकादशेसंवत्सरेतीतेराजा पुरुषैर्नामदेजयसंवत्सरेतर्से
तश्रावणशौर्णमास्यांवासुनाः प्रर्क्षेरुद्रपदाम्रकात्रेप्रथमकेतादकातिसर्ट्टेण ।।पुंडव
र्द्धनवास्तविनिर्गतकौशिकसवाकुवाजिकावेसवस्त्रचालिदालादनरुद्रसुताय
कस्यवदीन्द्रितायनामंपुरीसपूस्तांतर्भूतत्वाहग्रामःसदकूमाभाकुलः स
दशब्राह्मिणेभ्यःसदशदाषदशायपावसरूतापातुप्रत्ययः त्रावाटहटप्रवेस

ऋतोतुनाथोब्रह्मदायक्यायेकाचंद्रार्कं कमस्योदतुः यस्यद्वाघाटाःपूर्व्वतः द्योत
ग्रामः दक्षिणतः वंजलीकामाग्रामः पश्चिमतः विचंविहरुकामाग्रामः उत्तरतः
सोकहीकामाग्रामः एवंचतुर्नाप्यांर विसुद्धंलोहग्रामं केसवदीक्षितस्य कृपतः क
र्षयतोहुंजतोहोजयतोवाककेविद्याघातः कार्यः मद्वाकिलाक्षोलितजलतरंगात
नलमैसूर्यसनदहुविद्रुमंजीवितंसामाक्यंचहूमिदाकपालमवगाद्धिः नागा
मिकृपतिहिचस्मद्वंस्यैर्वायमस्मद्वर्म्मदायः समकुमंतव्यः प्रतिपालकीयश्च ॥ उक्तं
च नामरुद्रेण ॥ सामाक्योयंवर्म्मासेतुर्कपालंकालेकालेपालकी
योहवद्भिः सर्व्वाकेवंहाविकः पार्थिवेंद्राकूयोदूयोयाचते
नामरुद्रः ॥ षष्टिवर्षसहस्राणिस्वर्गेतिष्ठतिहूमिदः ॥ आच्छेत्तुचाकुमं
ताचताक्येवकनकेवसेत् ॥ स्वदत्तांपरदत्तांवायोहरेतुवसुंधरां
स्वविष्ठायांकृमिर्हूत्वापितृभिस्सहपच्यते ॥ प्रसत्यासंप्रदाकेकद
तस्याहरणेकव ॥ जन्मप्रहृतियद्दत्तंतत्सर्व्वंनिष्फलंहरेत् ॥ क
ल्पकोटिसहस्राणिकल्पकोटिसताकिच ॥ निवसेद्ब्रह्मणेलो
केहूमिदाकंददातियः ॥ सिवमस्तुसर्व्वजगतः ॥ ॐकमः सिवाय ॥

Table explanatory of the Plate Characters (88 5 31) A.D 933.

Modern Pallodá Letters	Corresponding English Letters	Plate Character: Diff.t forms of the same letters				Modern Pallodá Letters	Corresponding English Letters	Plate Character: Diff.t forms of the same letters				English Vowel or Vowels to which the Vowel corresponds	Modern Vowel marks	Plate Vowel marks: Diff.t forms of the same marks	
अ	a					ट	ta					a	—	—	
आ	á					ठ	tha					á	⊤	⊤	⊤
इ	i					ड	da					i	⊢	⊂	
ई	í					ढ	dha					í	⊣	⊃	
उ	u					ण	na					u	⊥	∩	∪
ऊ	ú					त	ta					ú	⊥	∩	
ऋ	ri					थ	tha					e	⊥	∩	⊂
ॠ	rri					द	da					ae	⊥	∩	⊃
ऌ	li					ध	dha					o	⊤	⊂	
ॡ	lli					न	na					ao	⊣	⊃	
ए	e					प	pa					+	÷	०	
ऐ	ae					फ	pha					ah	⁚	⁚	
ओ	o					ब	ba								
औ	ao					भ	bha								
अं	am					म	ma								
अः	ah					य	ya								
क	ka					र	ra								
ख	kha					ल	la								
ग	ga					व	wa								
घ	gha					श	sha								
ङ	ńa					ष	sha								
च	cha					स	sa								
छ	chha					ह	ha								
ज	ja					क्ष	ksha								
झ	jha					ज्ञ	jńa								
ञ	ńa														

* Viz in Italic, n is used to represent the sound of the Anooswar, when followed by any of the letters after य ma.

..... Dotted letter indicates that its exact form is somewhat doubtful.

* Letters thus marked are different from any to be found in Prinsep's Tables.

Most of the unmarked letters resemble those of the Kutila inscription Table (A.D. 992.)

TRANSCRIPT OF CHARTER, DATED SHAKA 855, A. D. 933.

[*The asterisk * denotes the end of each line in the plates.*]

७ जयति ब्रह्मणः सर्ग्गनिष्पत्ति मुदितात्मनः सरस्वती रूतानंदा मधुरास्साम गी
तयः ॥ तारा चक्राब्ज * षंडा वृतगगन सरष्पद्मिनी राजहसा । त्रैलोक्यैकाधिप
त्य स्थित मदन महाराज शुद्धात पत्रात् * लावण्य क्षीरसिंधो द्युतिरजतगिरे
द्दिग्व धूदंतपत्रा । द्वंशःसोमादयं यस्त्रिभुवन कमलावास * सौधादुपेतः ॥ तस्माच्छ्रि
यः कुलगृहं भवनं महिम्नः क्रीडास्पदं स्थितिमहर्द्धी गभीरतानां * त्रायन्नसत्व प
री पालन लब्धकीर्त्ति र्व्वशोबभुव भुवि. सिधुनिभोयदुनां ॥ परिणतपर मंडलः क
ला * वान् प्रविततबहलयशोंशु पूरिताशः । शशधरइव दंन्ति दुर्गराजो यदुकु
ल विमलवियत्यथोदिया * य ॥ तस्याद्यं नृपतेः पितृव्य उदयी श्रीवीरसिंहासनं मे
रोः शृंगमिवाधिरुह्य रविवद्धि * कृष्णराजस्ततः । ध्वस्तोदृक्त चलुक्यवंशतिमिरः
पृथ्वीभृतां मस्तके न्यस्तादृः सकलं * जगतप्रविततै स्तेजोभी राक्रांतवान्॥तस्मा द्गो
विन्दराजो भूविन्दु बिम्बशिलातले यस्य रि * प्लोषधूम्रो कः प्रशस्तिरिवलक्ष
ते॥तस्याभवदभुवन पालन वीरबुद्धि रुद्धूतशत्रु कुल संतति रिद्धतेजाः । * राजानुजो
निरुपमा परनामधेयो यन्मुद्रयांबुधि रपि प्रथितः समुद्रः ॥ तदनुज गत्तुंगो जनी
परि * हत निजसकल मंडलाभोगाः गतयौवन वनिता जन कुचसदृशा यस्य
वैरि नृपः तस्मा च्चा * मोघवर्षो भव द तुलबलो येन कोपादपूर्व्वैश्चालुक्याभुषखा
द्यै र्ज्जनितरतियमःप्रीणितो विंग * वक्त्या ॥ वैरि चांडो दरांत र्व्वहि रुपरितले य
न्नलब्धा वकाशं तोयव्याजाद्विशुद्धं यशइव निहितं तज्ज * गत्तुंगसिंधौ ॥ तस्मा द
कालवर्षो नृपति रभुद्यत्पराक्रमत्रस्तैः सद्यः समंडलाग्रं खेटकमहि * तैः परित्य
क्तं ॥ सहस्राज्जुनवंशस्य भुषणं कोक्कलात्मजा । तस्या भवन माहादेवी जगत्तुंग *

स्ततोजनि ॥ गंभीराद्रत्ननिधे र्भुभृत्प्रतिपक्ष रक्षणक्षमतः कोक्भल सुतरण विग्रह ज

लधेल्लक्ष्मीः स * मुप्तन्ना ॥ सा जाया जायताजातशत्रो स्तस्य महीभुजः भीमसेना र्ज्जुनो पात् यशो भुषण शालिनः ॥ * तत्र जगत्तु गोदयधरणीधरतः प्रताप कलितात्मा लकन्म्या नंदन उदितो जनीविजयो राजमार्त्तण्डः ॥ स्थिति च * लितसकल भूभृत्पक्षच्छेदाभिमुक्त भुज वंद्यः अनिमिष दर्शनयोग्यो यः स त्यमिहेद्रराजइति ॥ यस्तस्मिन्दशकंठ * दर्प्प दलने श्रीहैहयानां कुल कोक्क लः प्रतीपादितोस्य च गुणजेष्ठो र्ज्जुनोभूत्सुतः तत्पूत्रो म्गणदेव इत्यति ब * ल स्तस्माद्विजाम्बाभव त्पद्मे वांबुनिधे रुभेव हिमवन्नाम्नः क्षमा भृत्प्रभोः ॥ श्रीन्द्र नरेंद्रात्तस्यां सूनुरभुद्भूपतिर्द्धि * जांबाया गोविन्दराजनामा कामाधीक रूप सान्दर्यः ॥ सामर्थ्ये सति निन्दितां प्रविहिता नैवाग्रजेक्रूरता बन्धुः स्त्री * गमनादिभिः कुचरितै रावर्ज्जितं नायशः ।शौचाशौचपराङ्मुखं नच भिया पैशाच्यमं गीकृतंत्या * गैना समसाहसै श्च भुवने यस्साहसां कोभवत् ॥ वर्षन् सुवर्ण्णवर्षः प्र भुतवर्षोपि कनक धा * रामिः जगदखिलमेक काचनमय मकरो दितिजनैःरु क्त ॥ यदधि दिग्विजया वसरे सति प्रस * भ संभ्रम भावन एवभुः । सपदि नृत्यति पाली महाध्वजो कृतकरान्यकुनाथ विवर्ज्जिता ॥ सहते हि मंडलाधिपं प * रे मे षो भ्युदयी समुद्धतं ॥ इतिज्मतभीया धिया ग्रतो रविचंन्द्रा वपि यस्य धावते ॥ अ वन तपरमंडले * श्वरं सहविजयशृभिवेश्मशोभितं समही मकरतोरणं चिरं नि ज तेज स्तति यस्य राजते ॥सह * ते समताहि धीमयं नपरेषा सविशेशालिनी ॥ यदनिदित राजमदिरं ननु गंगा यमुना च सेवते * यस्मिन्राजनि सौराज्य निर्ज्जितारि वितन्वति विमान स्थिति रित्यासी न्नभोगेषुकवाचनं ॥ यस्यो द्दाम प्रता * पानल बहल शिखा कज्जलं नीलमेघा वीस्फूर्ज्जत् खड्गधारा स्फुरण वि सरणा न्येव विद्युद्विलासाः * दुर्वारारीभकुंभ स्थल दलनगल न्मौ क्तिकान्येव ता रा श्चंद्र क्षीराब्धि शेषाभृतभुवनयशो राशिनिष्यंदितानि ॥ *

यस्मिंन्कंट कशोधनो त्सुकमनश्यं भाजनालैर्भृये वान्मग्नं नपयस्सु कोशवसति लक्ष्मीः कृतोपायनं के * तक्या पवनोल्ल सन्नि जरजः पुंजांधकारोदरे भूगर्ब्भेपनसेन वेत्र लतयाद्वार्या त्म शुध्धै स्थितं ॥ यश्चं समु * पहसित हरनयनदहने ।वेहिता नित्य

कन्दर्परूप सौंदर्यदर्पः श्री नित्यकन्दर्पः प्रभु मंत्र शत्यु पबृंहि * नोत्साह शक्ति समाक्षिप्त शतमुखमुख शचाणक्य चतुर्मुखः । प्रथितैक विक्रमाक्रांत वसुंधरा हितकर ण प * रायणः श्रीविक्रांत नारायणः । रूकर कलीतदेतिहलदलित विपक्ष व क्षस्थल क्षेत्रः श्रीनृपतितृणेचः ॥ ** समभव त्सच परमभट्टारक महाराजाधिरा जा परमेश्वर श्रीमन्नित्यवर्षदेव पादानुध्यात परमभट्टार * क महाराजाधिराजा परमेश्वर श्रीमत्सुवर्ण वर्षदेव पृथ्वीवल्लभ श्रीभद्दलभनरेदेवः कुशली सर्व्वा नेव * य तासंश्च त्यमानकान् राष्ट्रपति विषयपति ग्रामकूट महत्तरयुक्त कोप युक्तकाधिका * रिकान् समादिशत्यस्तु वः संविदितं यथा मान्यखेटराजधानी स्थिरतरां वस्त्रानेम माता * पित्रो रात्मनश्च पुण्य यशोभिवृद्धये पुर्व्व लुप्तानपि देवभोगायहारान् प्र तिपालय * ता प्रतिदिनं च निरवधिनमस्यग्रामशासनानि शतसः प्रयाच्छता श कनृप कालातीतसंवत्सर * शते ष्वष्टसु पंचपंचाशदधिके ष्वकतोपि संवत्सराणां ८५५ प्रवर्तमान विजयसंत्सरांतर्ग * त श्रावण पौर्णमास्यां वोरे गुरोः पूर्व्वाभ द्रपदानक्षत्रे प्रथमकरोद्कातिसर्गेण ॥ पुडव * र्द्धन नगर विनिर्गतकौशिक गोत्र वाजिकाण्व सब्रह्मचारी दामोदरभट्टसुताय * केशवदीक्षिताय रामपुरी स शतांतर्गत लोहग्रामः सदक्षमालाकुलः स * धान्य हिरण्यादेयः सदण्ड दोष दशापराध समूतोपात्त प्रत्ययः आवाट भट प्रवेश *

शतात्तरायो ब्रह्मदाय न्यायना चंद्रार्कनमस्योदत्तः यस्य चाघाटाः पूर्व्वतः घो डे * ग्रामः दक्षिणतः वजुलोनामाग्रामः पश्चिमतः विंचविहरभनामाग्रामः उत्तरतः * सोन्नहीनामाग्रामः एवं चतुराघाटविशुद्धं लोहग्रामं केशवदीक्षित स्य कृषतः क * र्षयतो भुंजतो भोजयतो वानकेचिद्वयाघातः कार्यः मत्दानिला नदोलित जलतरंग त * रलमैश्वर्य शरदब्भ विब्भमं जीवितं सामान्यं च भुभो दान फलमवगच्छद्भिः राजा * भिनृपतिभि रस्मद्वंशे ष्वायमस्मद्धर्म्मदायः सनुम तव्यः प्रतिपालनीयश्च ॥ उक्तं * च रामभद्रेण ॥ सामान्योयं धर्म्मसेतु नृपाणांका लेकाले पालनो * यो भवद्भिः सर्व्वानेवभाविनः पार्थिवेंद्रान् भूयोभूयोयाचते * रामभद्रः ॥ षष्टीवर्ष सहस्राणी स्वर्गेतिष्ठति भूमिदः । आच्छेत्ताचानुम * ताचा

तान्येव नरके वसेत् ॥ स्वदत्तां परदत्तां वा यो हरेत्तु वसुंधरां * स्वविष्ठायां कृमि भूत्वा पितृभिस्सह पच्यते ॥ प्रसृत्यासं प्रदानेन द * तस्यापहरणेनच । जन्मप्रभृ तियद्दत्तं तत्सर्व्वं निष्फलं भवेत् ॥ क * ल्पकोटी सहस्राणि कल्पकोटि शतानि च ॥ निवसेद्ब्रह्मणो लोके * भूमिदानं ददातियः ॥ शिवमस्तु सर्व्वजगतः ॥ ओंनमः शिवाय *

Facsimile with Transcript of Charter dated, Shaka, 1182 A. D. 7261.

॥स्वस्ति श्री शकु ११८२ वर्षे गोद्र संवत्सरे । पुष्य वदि
स्व स्ति श्री श कु ११८२ व र्षे गो द्र सं व त्स रे । पु ष्य व दि

सप्तमि शनि दिने । अद्येह समधिगत पंचमहाशब्द
स प्त मि श नि दि ने । अ द्ये ह स म धि ग त पं च म हा श ब्द

महामंडलेश्वर । कल्याणपुरवराधीश्वर । कलियुग
म हा म ड ले श्व र । क ल्या ण पु र व रा धी श्व र । क लि यु ग

कर्णान्वयप्रसूत । चालुक्यकुलकमलकलिका विकास
क र्णा न्व य प्र सू त । चा लु क्य कु ल क म ल क लि का वि का स

भास्कर । सुवर्णवराहलांछनध्वज सत्यपन्नाकर । शरणाग
भा स्क र सु व र्ण व रा ह लां छ न ध्व ज स त्य र ला क र । श र णा ग

तवज्रपंजर । महामाहेश्वर । महेश्वरदेवचरणप्रसादनाप
त व ज्र पं ज र । म हा मा हे श्व र । म हे श्व र दे व च र ण प्र सा द ना प

धनोपचारादवाप्तपरमभाज्येश्वर । श्रीकेदारदेवपद
ध नो प चा रा द वा प्त प र म स ज्ये श्व र । श्री के दा र दे व प द

पंकजभ्रमर । रायधरणीवराहराय । बटकाररिपुराय
पं क ज भ्र म र । रा य ध र णी व रा ह रा य । ब ट का र रि पु रा य

साहसमल्लश्रीकांवदेव रायविजयभाज्यादे । त
सा ह स म ल्ल श्री कां व दे व रा य वि ज य भा ज्या दे । त

Plate IV (2).

द्राज्यभारचालनसमर्थ। आचारनिपुण। सारासार विचारचतुर।
द्राज्य भार चालन समर्थ आचार निपुण। सारासार विचारचतुर।

सकलकलाकुशल। महामात्यमंत्रचूडामणि। श्री केशवमहा
सकल कलाकुशल। महामात्य मंत्र चूडामणि। श्री केशव महा

जनिना। श्री कांवटेवराय। प्रसादलब्ध। तेरवाटकनाम। धेयो
जनिना। श्री कांवटेवराय। प्रसादलब्ध। तेरवाटकनाम। धेयो

यग्रामः। उत्तरायणसंक्रांतिपर्वणि। परमया भक्त्या। महाधा।
यग्रामः। उत्तरायण संक्रांति पर्वणि। परमया भक्त्या। महाधा।

मिंकेण भूत्वा सव्रिक्षमालाकुलसोपरिकर। दंडदोषमा
मिंकेण भूत्वा सव्रिक्षमालाकुल सोपरिकर। दंडदोषमा

र्गणसहितचतुःसीमापर्यंतं। निधिनिक्षेपसहितविंशति
र्गणसहितचतुःसीमापर्यंतं। निधिनिक्षेपसहितः विंशति

विप्रसहिताय भारद्वाजगोत्रोत्पन्नाय अष्टभोगसहित
विप्रसहिताय भारद्वाजगोत्रोत्पन्नाय अष्टभोगसहित

केशवप्रभवे। हस्तोदकेन प्रदत्तः। तदर्थशासनं प्रय
केशवप्रभवे। हस्तोदकेन प्रदत्तः। तदर्थशासनं प्रय

कति। तेषामेतानि नामानि। ह्रीटसीवारसंबंधिनी शू
दानि। तेषामेतानि नामानि। ह्रीटसीवारसंबंधिनी शू

द्रप्रजोपजीविनी समग्र। भूमिविमलेश्वरदेवस्य। तथा
द्रप्रजोपजीविनी समग्र। भूमिविमलेश्वरदेवस्य। तथा

देवस्य संनिधौ। या भूमिः सा। भारद्वाजगोत्रस्य। माधवदेवस्य। गं
देवस्य संनिधौ या भूमिः सा। भारद्वाज गोत्रस्य। माधव देवस्य। गं

धधूपनिवेद्यार्थं। भार्गवगोत्रनागदेवक्रमेत। काश्यपगोत्रविठ
धधूपनिवेद्यार्थं। भार्गव गोत्र नागदेव क्रमेत। काश्यप गोत्र विठ

लपैशास। भार्गवगोत्रविठलपैशास। भारद्वाजगोत्र। उक
लपैशास। भार्गव गोत्र विठलपैशास। भारद्वाज गोत्र। उक

लपैशास। ब्रह्मचसहित। गार्ग्यगोत्रगोंदभट। अत्रिगो
लपैशास। ब्रह्मचसहित। गार्ग्य गोत्र गोंदभट। अत्रि गो

त्रसोमदेभट। वासिष्ठगोत्रसोमदेक्रमेत। वाशिष्ठगोत्रके
त्र सोमदेभट। वासिष्ठ गोत्र सोमदेक्रमेत। वाशिष्ठ गोत्र के

शवभटकाश्यपगोत्र। माधवभट। मुदुगलगोत्र। वासुदेवभट
शवभट काश्यप गोत्र। माधवभट। मुदुगल गोत्र। वासुदेवभट

वासिष्ठगोत्रपदुमणभट। गार्ग्यगोत्र माधवभट। अत्रिगो
वासिष्ठ गोत्र पदुमणभट। गार्ग्य गोत्र माधवभट। अत्रि गो

त्रअच्युतभट। काश्यपगोत्रवामनभट। भारद्वाजगोत्रना
त्र अच्युतभट। काश्यप गोत्र वामनभट। भारद्वाज गोत्र ना

रणभट। भारद्वाजगोत्रनारणठाकुरस्य चौधिरिक। सा
रणभट। भारद्वाज गोत्र नारणठाकुरस्य चौधिरिक। सा

ग्रामप्रतिपालकः। भारद्वाजगोत्रहरिदेवभट। भार्गवगोत्र
ग्राम प्रतिपालकः। भारद्वाज गोत्र हरिदेवभट। भार्गव गोत्र

तिकलभट। एवमेतानिना मानिदेवसंनिधौ। तां
तिकलभट। एवमेतानिना मानिदेवसंनिधौ। तां

Plate IV. (4)

ब्रभाजनपूर्वक। शाश्वतमठं धर्मकार्यार्थकप्राटकवाटिका।
ब्रभाजनपूर्वक। शाश्वतमठं धर्मकार्यार्थकप्राटकवाटिका।

चत्वारिअकसंख्याजाल्हणराउलसुतगोंराउलस्यदातव्यंग्रामो
चत्वारिअकसंख्याजाल्हणराउलसुतगोंराउलस्यदातव्यंग्रामो

यमात्रान्वयसंभूतराज्ञाअपरेणवाधार्मिकेणभूत्वापालनीयं। य
यमात्रान्वयसंभूतराज्ञाअपरेणवाधार्मिकेणभूत्वापालनीयं। य

थादाश्रेयभाकुपालकोपिभविष्यति। बहुभिर्वसुधादत्ताराजभिःसगरा
थादाश्रेयभाकुपालकोपिभविष्यति। बहुभिर्वसुधादत्ताराजभिःसगरा

दिभिः। यस्ययस्ययदाभूमिस्तस्यतस्यतदाफलं। स्वदत्तांपरदत्तांवायो
दिभिः। यस्ययस्ययदाभूमिस्तस्यतस्यतदाफलं। स्वदत्तांपरदत्तांवायो

हरेत्यवसुंधरां। षष्ठिर्वर्षसहस्राणिविष्ठायांजायतेक्रिमि। क्रिमि
हरेत्यवसुंधरां। षष्ठिर्वर्षसहस्राणिविष्ठायांजायतेक्रिमि। क्रिमि

योनिततोगत्वाचांडालेष्वभिजायते। हिरण्यमेकंगामेकंभूम्यामे
योनिततोगत्वाचांडालेष्वभिजायते। हिरण्यमेकंगामेकंभूम्यामे

ष्येकमंगुलं। हरंनरकमायांतियावदाहूतसंप्लवं। नविषंविषमि
ष्येकमंगुलं। हरंनरकमायांतियावदाहूतसंप्लवं। नविषंविषमि

त्याहुर्ब्रह्मस्वंविषमुच्यते। विषमेकाकिनोहंतिब्रह्मस्वंपुत्रपौत्रि
त्याहुर्ब्रह्मस्वंविषमुच्यते। विषमेकाकिनोहंतिब्रह्मस्वंपुत्रपौत्रि

कं। मद्वंशजातःपरवंशजातःपापादपेतमनसोभुविभारभूताः। य
कं। मद्वंशजातःपरवंशजातःपापादपेतमनसोभुविभारभूताः। ये

पालयंतिममधर्ममिदंहिसर्वेतेभ्योमयाविरचितोजलिमूर्ध्निरे
पालयंतिममधर्ममिदंहिसर्वेतेभ्योमयाविरचितोजलिमूर्ध्निरे

षा॥ श्रीगोविंदेनविलिखाते। श्रीमंगलमाहेश्री ९८५
षा॥ श्रीगोविंदेनविलिखाते। श्रीमंगलमाहेश्री ९८५

TRANSCRIPT OF CHARTER, DATED SHAKA 1313, A.D. 1391.

[The Facsimile of this Plate was not obtained.]

श्री महागणाधिपतयेनमः ॥ अविघ्नमस्तु ॥ नमस्तुंगशिरश्चुंबी चंद्रचाम रचाखे ॥ त्रैलोक्य नररारंभमूलस्तंभाय शंभवे ॥ लीलाकोलः सजयति हरिः कुं दलक्ष्मी दुधद्य द्वंष्ट्रानाले नालेननमिवभू मंडलं तद्बीभाति ॥ यत्र स्वर्णक्षितिधरपतिः कर्णिकावर्षपंक्तीः पत्रश्रेणी कुलशिखरीणः केसराणां प्रसारः ॥ तस्मिन्भारत वर्षद क्षिणदले देशोस्ति कर्णाटका स्तन्मध्ये सरिदुतमा विजयते सातुंगभद्राभिधा ॥ य त्तीरे दुरिताटवीहुतवहे देवो विरूपाक्ष इत्यास्ते संततमंतरेण सुमनः स्रोतस्वीनी चिंतनं ॥ तस्योपकंठे विजयाभीधाना सादुर्जया राजति राजधानी ॥ यस्यां विरू पाक्षकटाक्ष दृग्घ मुज्जीवयंतिस्म रमुत्फलाक्ष्यः ॥ वंशे यदो रभिनवांशईवाच्युतस्य श्री संगमादजनिसंगररंगभीमः ॥ श्रीबुक्कराज इति धिकृत शत्रुरेष तामध्यतिष्टदध मध्यमलोकपालः ॥ अथ भुवंभवगामिनः सुतं हरिहरोदीशपराक्रमम् ॥ जगदि नः समजीगमदादरा त्सचतुरं चतुरं बुधिमेखलाम् ॥ आकर्ण्णस्थ सरिद्वुरोत रतटा दापूर्वपाथोनिधे रासेतो खनिं चिरादवति सत्यापश्चिमांबोनिधेः ॥ स्थाने स्मिन् गुणनां मभिर्हरिहरो राजाधिराजादिभी राजोर्वीपति मौलिमालितपदां भो जे महीवल्लभे ॥ तस्याज्ञया माधवमंत्रिवर्यः प्रशाज्जयंती पुरराज्य मृह्यम् ॥ यन्मंत्र शक्त्या वपुरुत्सृजंतोप्यरातयाः स्वास्थ्यामहो भजंते ॥ आशांतविश्रांतयशाः समंत्री दिशो जिगीषुर्महता बलेन ॥ गोवाभिधां कौकणराजधानीं मन्येनमन्ये रुणद र्णवेन ॥ प्रतिष्ठितां सचतुरष्कसंधानुत्पाद्यदोष्णा भुवनैकवीरः ॥ उन्मूलिता ना मकरोत्प्रतिष्ठां श्री सप्तनाथादिसुधा भुजां यः ॥ तस्मिन्नृते क्षीतितले सति कीर्तिशेषं सन्मंत्रिभि र्हरिहरो नृपतिर्विचार्य ॥ गोवापुरे नृहरिमंत्रिण मादरेण राज्ये पदेसमभिषिच्य पुरोजयंत्याः ॥ आश्रयान्वयवारि धावुदभव न्मंबांबिका ग र्भतः साक्षाद्रसाभिधद्वीजवरा ध्यो भास्करस्याग्रजः ॥ विद्याशंकर सनकृपा मृ तरसासारेण संवद्वीतो विद्वत्कलप महीरुहो नरहरिः क्षोणीपति र्भा सते ॥ कृत्वा सप्तपदानि सप्तसु महाद्वीपेषु भूभृच्छिला मास्थायाथ विमुच्य शा त्रवयशो लान्प्रतापानले ॥ प्रत्यक्षेण विलोकितुं दीवमपि प्राप्ता तथारंधति मित्थं कीर्तिवधूः सदा नरहरि क्ष्मापं वृणीते वरम्॥ स्वति श्री शके त्रयोदशाधिक त्रिशतो तरसहस्रे गते वर्तमान प्रजापति संवत्सरे वैशाखमासे कृष्णपक्षे अमावास्यायां सौम्यदिने सूर्योपराग पुण्यकाले स्वस्ति श्रीमन्महा मंत्रीश्वर उपनिषन्मार्ग प्रवर्तका चार्यः श्री मन्माधवराजः कुचरविषय वर्तिनं कुचरनामानं ग्रामं माधवपुरमिति प्रथीतनामधेयं सर्वमान्यमग्रहारं कृत्वा पंचविंशति वृति कल्पनामा कलप्य श्रुता

ध्ययनसंपन्नेभ्यः चतुर्विंशति ब्राह्मणेभ्यः सहिरण्योदकदान द्वारापुर्वकं तं ग्रामं संप्रद द इति प्रदतं धर्मशासनं तेषां ब्राह्मणानां गोत्र नाम विवरणम् ॥ भारद्वाज गोत्र स्य ऋक् शाखाध्यायिनः अनंतभट्ट पुत्र दामोदरभटस्य वृतिरेका १ वासीष्ट गो त्रस्य ऋक् महादेव पुत्रानंतभट पुत्रस्य वृतीरेका २ आत्रेय गोत्रस्य ऋक्० नार सीहभट पुत्र वासुदेवभटस्य वृतिरेका ३ भारद्वाज गोत्रस्य ऋक्० अंनंतभट पुत्र दामोदरकानभटस्य वृतिरेका ४ आत्रेय गोत्रस्य ऋक ० वासुदेवभट पुत्र दा मोदरभटस्य वृतिरेका ५ आत्रेय गोत्रस्य ऋक् ० नारंभट पुत्र महादेवभटस्य वृतिरेका ६ जांमदग्न्य गोत्रस्य ऋक् ० महादेव पुत्र वामनभटस्य वृतिरे का ७ आत्रेय गोत्रस्य ऋक ० दामोदरभट पुत्र रामभटस्य वृतिरेका ८ भारद्वाज गोत्रस्य ऋक् ० अनंतभट्ट पुत्र कानभटस्य वृतिरेका ९ जामदग्न्य वत्सगोत्रस्य ऋ क् ० विठलभट पुत्र पौम्मोदवभटस्य वृतिरेका १० कुत्सगोत्रस्य ऋक्० महादेवभ ट पुत्रानंतभटस्य वृतिरेका ११ जामदग्न्य गोत्रस्य ऋक् ० केशवभट पुत्रानंतभटस्य वृ तिरेका १२ आत्रेय गोत्रस्य ऋक् ० गोविंदभट पुत्र जनार्दनभटस्य वृतिरेका १३ जामदग्न्य गोत्रस्य ऋक् ० रामकृष्ण पुत्र विष्णुभटस्य वृतिरेका १४ आत्रेय गो त्रस्य ऋक् ० दामोदरभट पुत्र हरीभटस्य वृतिरेका १५ कौशिक गोत्रस्य ऋक् ० मांदे श्री पुत्र गोविंदभटस्य वृतिरेका १६ जामदग्न्य गोत्रस्य ऋक् ० विठलभट पुत्र वा सुदेवभटस्य वृतिरेका १७ कौशिक गोत्रस्य ऋक् ० गोविंदभट पुत्रस्य पौम्मिदेवभटस्य वृतिरेका १८ जामदग्न्य वत्सगोत्रस्य ऋक् ० हरीभट पुत्र महादेव भटस्य वृतिरेका १९ वासीष्ट गोत्रस्य ऋक् ० नारायणभटपुत्र तानभटस्य वृतिरेका २० जामदग्न्यव त्स गात्रस्य ऋक् ० महादेवभटपुत्र भटंभटस्य वृतिरेका २१ भारद्वाज गोत्रस्य ऋक् ० नामदेव भट पुत्रविठलभटस्य वृतिरेका २२ भारद्वाजगोत्रस्य ऋक् ० दामदेवभट पुत्र माहादेवभटस्य वृतिरेका २३ वासीष्ट गोत्रस्य ऋक् ० गोविंदभट पुत्र केशवभटस्य वृ तिरेका २४ भारद्वाज गोत्रस्य ऋक् ० अनंतभट पुत्र दामोदरभटस्य पुनर्मंहाजनैः अन्यादत्ता वृतिरेका २५ एवं पंचविंशति वृतयाः कुचरीनामधेयस्येदानीं कृत माधव पुराभिधंतस्या ग्रहारस्य चतुः सीमाविवरणं ॥ पुर्वस्यां दिशी पाटग्रामस्य सी म्नो पर्वत शिरसि वटवृक्ष पाषाणः ॥ दक्षिणस्यां दिशी म्हापण ग्रामस्य सीम्नि अरे णमध्यतपर गालीती क्षारीक्षेत्रं तर्गतं कृत्वातत्प्रभृति पश्चिम दिगनुखारीप्रकारं समीपतः समुद्रवेलायां हृदश्च ॥ पश्चीमस्यां दिशी समुद्रः ॥ उतरस्या दिशी परी त्य ग्रामस्यसीम्नि प्रवाहादधः समुद्रपर्यंतो क्षारोदकनदीच ॥ एवं चतुः सीमात र्गतं माधवपुरा ग्रहारं सहिरण्योदकदानधारापुर्वकं सर्वनमस्यसर्वबाधा विव र्जितं नीधो निक्षेप जल पाषाण सिद्धसहितं चतुर्विंशति ब्राह्मणाः सुखेन भुंजी रन् ॥ सामान्योयं धर्मसेतुर्नृपाणां काले काले पाले पालनीयो भवद्भीः सर्वानेता न् भाविनः पार्थिवेंद्रान्भूयो भूयो याचते रामचंद्रः सदतां परदतां वायो हरेत वसुन्धराम् ॥ षष्टीवर्ष सहस्राणी विष्टांया जायतेकृमीः॥ श्री शुभमस्तु॥.

ART. V.—*A Comparative Vocabulary of the Non-Sanscrit Vocables of the Vernacular Languages of India.* By the Rev. J. STEVENSON, D. D.

Presented December 11th 1851.

PART I.

Philology and Ethnology are two branches of knowledge, which, though seemingly independent, are yet intimately connected, and throw mutual light on one another. No sojourner in India can have paid any attention to the physiognomy of the higher and lower orders of natives without being struck with the remarkable difference that exists in the shape of the head, the build of the body, and the colour of the skin, between the higher and lower castes, into which the Hindú population is divided. The high forehead, the stout build, and the light copper colour of the Brahmans, and other castes allied to them, appear in strong contrast with the somewhat low and wide heads, slight make, and dark bronze of the low castes. Every one feels, on contemplating these characteristic marks, that he has been brought in contact with two distinct races of the human family. It is usually found that difference of language characterizes difference of race, and therefore in the present instance we should expect a difference in the speech of these two classes of the inhabitants of India. In all nations, even where the higher and lower orders are of the same race, such differences do indeed exist, as in England; and, on the other hand, where the races are totally distinct, as in the West Indies, the same language is usually spoken by both; yet in the last mentioned instance there are usually to be found traces of the ancient tongue of the subject people, mingled with the newly-adopted language of their masters. It is this ancient language of the subject race in India that we are endeavouring to trace through the different spoken dialects, by means of this Comparative Vocabulary.

The spoken languages of all the nations of India Proper, including Ceylon and the adjacent islands, are mixtures in various proportions of the Sanscrit, the original language of the Brahmans, and another language of a different family, of which we find the most copious remains in the dialects of the hill tribes, and in the Canarese and Tamil languages. There has indeed been introduced, in later times, a multitude of terms of Arabic and Persian origin by the Mahomedan conquerors of India, relating to government, law, and new phases of civilization, which now enter more or less into all the vernacular tongues. The interest of this part of the Indian languages to the philologist and ethnologist is not however so great as to induce us to enter upon it, nor does it present any difficulties to any one moderately versed in Urdú. The same remark also applies in a great measure to the Sanscrit element in the Indian languages. I was rather surprised at first, when examining the Bengáli, Támil, Malayálim, and Singhalese dictionaries, to find one half of them occupied with the explanation of the very same Sanscrit words with which I was already familiar from meeting them in the Hindí, Maráthi, Gujaráthi, and other allied tongues. After collecting materials to some extent for a comparative list of Sanscrit derivations in the different vernaculars, I abandoned the work from the perception that in the almost perfect sameness of the adopted words there was nothing to compare, except a few terminations and euphonic changes, which ten words could illustrate as well as ten thousand. I found that as in the Italian, Portuguese, Spanish, French, and English, the Latin element common to all is derived from the Roman language in a peculiar stage of its development, so it was with the Indian vernaculars in reference to the Sanscrit. I may illustrate my meaning thus: the term for *a water-spring* is not derived in the European vernacular tongues directly from *fons*, but through the mediæval *fontana*, a word now found in the Italian, giving rise to the French *fontaine*, and English *fountain;* and in the same way *certain* comes from *certus*, following with many other words a form which first in the decline of classic literature showed itself in proper names, as Domitianus from Domitius, and Justinianus from Justus, and then, from a fancied superiority of sound, was forced upon common substantives and adjectives. The Sanscrit of the Indian vernacular tongues also is the Sanscrit of a certain age—of an age when the language had been brought out of the simplicity and barbarism of the Vedic period nearly into the state that it exists in the classic literature of the Brahmans. What is most singular is that in the language of Ceylon

these words are the same as in the languages of continental India. In Ceylon the Sanscrit element undoubtedly owes its origin to the Pali introduced by the Buddhist priesthood; nor is this Pali anything but a modified Sanscrit, differing not more from the Brahmanical tongue than the present Romaic from classic Greek. According to the most accurate researches of Mr. Turnour, as corrected by himself, Buddhism was introduced into Ceylon about the commencement of our era. We have little reason to believe that with the exception of the Vedic hymns, any portion of the Brahmanical literature extends beyond that period, but on the contrary, that much of it was composed after the decline of Buddhism. However this may be, the Sanscrit language since the beginning of our era can have undergone no important variations. It ceased before that period generally to be a spoken language, and was thus removed from the influence of the usual sources of change. The encouragement given by the Buddhists to the vernacular tongues tended to throw it a good deal into the shade, and left its cultivation to the more rigid ritualists. There is one change, however, which the Sanscrit has undergone, which we must notice, as it bears particularly on the subject we have in hand: it is the introduction into it of words from the vernacular languages of India. The question is, What words are Sanscrit?—Is every word found in a Sanscrit book or dictionary radically Sanscrit? This is a question of no easy solution. If on the one side we are obliged to take every word any Brahman has used in writing Sanscrit as belonging strictly to that tongue, then we must canonize as classical Latin all the Gallicisms and Germanisms of the writers of the middle ages. On the other hand, if we reject any portion, there is danger of our reasoning in a circle, and setting up our own fancies as the standard of truth. If we may reject what we like, and retain what we like, our conclusions become useless for any philological or ethnological purposes.

It is then a principle of language that the same men do not invent numerous terms to express the same idea. Ask any one acquainted with Latin what word in that tongue stands for *water*, he will without the least hesitation answer *aqua;* and if the corresponding Greek is demanded he will reply ὕδωρ; if the Persian, آب (âb); if the Hindustani, पानी (páni); if Bengáli, জল (jŏl); if Canarese, ನೀರ (níru); and so on in reference to other languages, giving only one word. True, in English we might use *fluid*, or *liquid*, instead of *water*, and *aqueous fluid* would be an exact counterpart expression; but every one at a glance perceives that these are either epithets, or derivatives from ano-

ther language. *Aqua vitæ, alcohol, spirits, barley bree,* are all used to denote the same liquid, but one of these words is taken from the Latin, another from the Arabic, and a third from the Scotch, and there is but one pure English term among the four. It is thus we judge of the numerous words used in the Arabic and Sanscrit to express the same idea; they are either mere epithets, or foreign or provincial words, adopted into the language. The Brahmans scattered through all the different provinces of Hindostan must have learned the languages of the tribes to whom they acted the part of astrologers and spiritual guides, and no doubt adopted many of the words of the languages of the tribes among whom they resided, and introduced them into the sacred tongue. In accordance with these principles, then, we would, if asked what was the old and radical Sanscrit word for water, say it was आपः (ápaḥ). जल (Jala) is an old Indian word used as the chief provincial term in Bengal, Orissa, and Ceylon to this day, to denote the substance in question. नीर (Níra) is Canarese, and pervades most of the languages of the South as well as that of the Todas, the primitive inhabitants of the Nilgherry Hills. उदक (Udaka) means strictly only a liquid; thus the author of the commentary on the Kalpa Sutra, in mentioning what things were most remarkable in their class, cites nectar as chief among liquids, उदकेषु अमृतं. Again सलिलं from its derivation, may be rendered a fluid. Try in the same way to derive the three first mentioned words from any radical ideal: आपः we are told comes from आप. to obtain, जल from जल, to hide or encompass, and नीर from नी, to obtain! The Brahmans ought to be ashamed of such absurdities. If the idea of water is to be derived from hiding or obtaining, we need no more stickle about the stories contained in the Purans. Such derivations and such transformations are equally probable. These are primitive words, and cannot be derived from verbal roots; and all except the first must have been introduced into the language by provincial writers, and then adopted by lexicographers.

In the present state of philological inquiries in India, however, I shall not be able to derive much advantage from the principle here laid down. Thoroughly convinced of its soundness as I am, if I were to make much use of it, it might seem as if it were introduced merely to serve a purpose. I shall not omit Sanscrit words that I decidedly think borrowed from the vernaculars, but the Sanscrit will also in these instances be given, and the reader left to form his own judgment. In reference to the Sanscrit portion of the vernacular languages of India, it is a singular fact that it is purer among the inhabitants of Malabar and

Mysore than among those of Bengal and Upper India. The reason of this can be easily given, though it be not at first obvious. In Upper India, Bengal, and Gujarath, nine-tenths of the language is a corrupted Sanscrit. The Brahmans and higher classes there more easily fall into the prevailing pronunciation of Sanscrit words, whereas in the South the Sanscrit vocables, being rarely used by any except Brahmans or well-educated persons, the primitive forms, though with the notable exception of the dropping of the proper marks of the genders of nouns, have been more carefully preserved. We may notice also that the Bengáli and Maráthi are strongly inclined to the use of the long *á* (आ) instead of the short (अ). They are the Doric dialects of India. The Singhalese has almost as much Sanscrit as the Hindustani, more at least considerably than the Támil and Canarese, confirming the tradition that derives the Buddhist colony from Orissa. These two last mentioned tongues retain most of what I deem the speech of the aboriginal Indians.

In reference to the order in which the following vocables are arranged, I have put the Canarese first, as containing the greatest number of words not Sanscrit, if I may judge from the dictionary which I have, viz. Garrett's Abridgement of Reeves. For the Támil words I use Rottler, for the Singhalese Clough, the Malayálim Bailey, the Bengáli Ram Comal Sen, the Maráthi Molesworth, the Gujaráthi Nowrojee Furdoonjee, the Hindí Thompson and Taylor, the Telinga Campbell, the Oriya Sutton, the Sindhí Stack. The last two and the Bengáli are English and Indian, the others have the words in the Indian tongue arranged alphabetically, as in Wilson's Sanscrit dictionary, of which I use the second, and of the other works the first editions. For the harsh *r* of the Southern languages I use in Devanagari ऱ, in English *rr*; for the last letter in the word Támil in Devanagari ऴ, in English *zh*. The Canarese, Telinga, and Maráthi languages often require ज to be pronounced, not *j*, but *z*, or *dz*, and the Támil and Malayálim have a peculiar *n*. There are rules for these, however, which those acquainted with those languages know how to apply, and I have not thought it needful to mark these changes of sound. The peculiar vowel of the Singhalese I have written अय and *æ*.

Before proceeding to the catalogue of aboriginal words we may exhibit a specimen of the transformations the Sanscrit undergoes when adopted into the vernacular tongues. Besides the forms here given, it is not unusual to meet with the pure Sanscrit word as well as the corruption in some of the dialects. The pure word will be heard from

the mouth of Brahmans, or be found written in the higher orders of compositions, while the corrupted form will be that used by the common people.

It is no uncommon thing, also, for the pure word to occur in certain senses, and the corrupted in certain others, thus enriching the language. For example कर्म is a word that applies in some of the vernaculars to religious, or irreligious acts, while its corruption, काम, means any common work or employment; in the same way as *rite*, in English, is "the prescribed manner of conducting religious services," while *fashion* and *custom* are used of things trivial and common.

Corruptions of Sanscrit Words in the Vernacular Languages.

Sanscrit.	Páli and Magadhi.	Hindi.	Sindhi.	Gujaráthi.	Maráthi.	Bengáli.	Uriya.	Singhalese.	Telinga.	Canarese.	Malayálim.	Támil.	Miscellaneous.	English & Latin.
अक्षि	अखि	आख	अखि	आख	अक्षि	....	अखि	अक	....	अक्कि	अक्षम्	अकि	*Punjábi*, ákh	the eye,
akshi	akhi	ákh	akhi	ákh	akshi	.....	akhi	aka	.....	akki	aksham	aki		oculus
कर्म्म	कम्म	काम	कमु	काम	काम	कर्म्म	कर्म	करण	कर्ममु	कर्म	कर्म्मम्	करमम्	*Tibetan*, karma	an act,
karmma	kamma	kám	kamu	kám	kám	karmma	karm	karana	karmamu	karma	karmmam	karumám		actus
एक	एक	एक	हिकु	एक	येक	एक	एक	एक्क	ओक	एकम्	एकम्	एगम्	*Persiàn*, yak	one,
eka	ek	ek	hiku	ek	yek	ek	ek	ekka	oka	ekam	ekam	egam		unus
द्वि, द्वय	दुवे	दो	ब	बे	दोन	दुइ	दुइ	देकयि	द्विकमु	द्वयि	द्विकम्	तुवि	*Latin*, duo	two,
dvi or dvaya	duve	do	ba	be	don	dui	dui	dekayi	dvikamu	dvayi	dvikam	tuvi	*English*, two	duo
													Cashmerian, zuh	
षष	छ	छ	छ	छ	साहा	छय	....	छयथि	षटमु	षट्	षट्	सडु	*Latin*, sex	six,
shush	chha	chha	chha	chha	sáhá	chhaya	.....	hayayi	shatamu	shat	shat	sadu	*English* six	sex
													Cashmerian, shoh	
हस्तिन	हत्थि	हाथी	हाथी	हाथी	हत्ती	हाती	हाती	अयतु	हस्ति	..	हस्ति	अत्ती		elephant,
hastin	hatthi	háthi	háthi	háthi	hatti	háti	háti	etu	hasti	....	hasti	atti		elephas

N. B.—It is particularly to be noticed that with a few trivial exceptions the words given in the first nine columns are those of most common use for the idea expressed, while in the last four the words given are uncommon, and only employed in composition, or used by Brahmans.

A COMPARATIVE

Of the Non-Sanscrit Primitives of the chief

No.	CANARESE.	TA'MIL.	MALAYA'LIM.	TELINGA.
1	आ á That, *Illud*	अ, अव a, av That, *Illud*	आं á That, *Illud*	आ अ á a That, *Illud*
2	अकटविकट Akatavikata Confused Involutus	अगडु Agadu Deceit Fraus	....	अकटविकटमु Akatavikatamu Topsy turvy Reversus
3	अक्क Akka An elder sister Soror major natu	अक्कै Akkai An elder sister Soror major natu	....	अक्क Akka An elder sister Soror major natu
4	अक्कर, अक्कर्ति Akkara, akkarti Love Amor	अगडु Agadu The inside Pars interna	अकतार् Akatár The heart Mens	अक्कु, अकटिक Akku, akatika The breast, mercy Pectus, misericordia
5	अक्कु, आगु Akku, águ To be, to become Esse, fieri	आग्रदु A'gradu To be, to become Esse, fieri	अकुन्नु Akunnu To be, to become Esse, fieri	अवु Avu To become Fieri
6	आकळु A'kalu A cow Vacca	कर्रैवे Karravai A milch cow Vacca lactaria	कर्रप्पि—कुन्नु Karrappi kunnu To give milk Lac præbere	कळ्ळि Kalli The milk bush Euphorbia tirucalli

No. 1.—The long and short vowels being frequently interchanged, the words will in this Vocubulary be usually found arranged according to the sound, without considering the length of the vowel, though care has been taken not to confound the two together in writing. Instead of अव in the Tamil, अ only is written before a consonant, but the consonant is doubled. To this list might be added the Scindian and Tibetan ह्वो, the Bengáli ओ, the Turkish او, Persian او, Slavonian *on*, Burmese *ho*; and from the hill tribes the Dhimal *u*, and Garo *oa*. In writing the Hindustáni and Maráthi in English characters, *w* is sometimes used as the substitute of व, when that suits the pronunciation much better.

No. 2.—The Latin terms are not here or elsewhere always exact synonymes, but sometimes further explain the idea given partially in the English. The root here is probably the Canarese interjection of surprise, अकट, *akata*.

No. 3.—The Sanscrit अक्का means *a mother*. It is an uncommon word, and probably taken from the Maráthi अक्का, which, especially when coupled with बाई, or बाईं, the cor-

VOCABULARY

Vernacular Languages of India.

SINGHALESE.	MARA'THI'.	GUJARA'THI'.	HINDI'.
अर् ऊ	ह्या	आ	वो
Ar ú	Há	á	Wó
That, *Illud*	This, *Iste*	This, *Istud*	That, *Illud*
अकटविकट	अकटविकट	.....	.....
Akaṭavikaṭa	Akaṭvikaṭ	.....	.....
Foolish pranks	Disorderly	.....	.....
Tripudia	Indigestus	.....	.....
अक्का	अका	.....	.....
Akkú	Aká	.....	.....
An elder sister	Elder sister	.....	.....
Soror major natu	O soror major natu	.....	.....
अरटुव	आवड	.....	.....
Araṭuva	A'wad	.....	.....
The heart	Love	.....	.....
Pars interna	Desiderium	.....	.....
.....	आव	.....	.....
.....	A'va	.....	.....
.....	Show, power	.....	.....
.....	Pompa, vis	.....	.....
कलकुमडव	कळप	.....	S कलाप
Kalkumaḍva	Kaḷap	.....	Kaláp
A herd, a company	A herd, a flock	.....	An assemblage
Agmen	Boum, &c. agmen	.....	Conventus

ruption of भार्या, means any elderly female. The Toda of the Neilgherries is *okena*, and the Tulu of the Malabar Coast *akke*, and the Tungusian, according to Klaproth, *oki*, for an elder sister. Among the Assamese tribes the Bhotia is *azhim*, the Changlo *ano*, the Garo *abi*, and the Kesháŕi *anobai*. The Tamil is no doubt also connected with the Tibetan *achhe*, and a truly aboriginal word.

No. 4.—This word has many words allied to it in the Southern tongues, but I cannot trace it in the Northern family further than the Maráthi.

No. 5.—The remark made on the last word is even more applicable to this.

No. 6.—The Hindi word here given is pure Sanscrit. The trace of connection with the Southern family commences in the Maráthi. The word in Hindi and Sanscrit applies to other kinds of collections, but never to those of cattle, where यूथ, or a corruption of it, is generally used. It would seem, then, that the Maráthas have adopted and corrupted the Sanscrit word, giving it also a new sense, derived partly from the ancient Indian, and partly from the Brahmanical tongue.

No.	CANARESE.	TA'MIL.	MALAYA'LIM.	TELINGA.
7	अगचु Agachu To press down Comprimere	कसङ्गुग्राडु Kasanggu-grradu To be squeezed compremi	....	गचुपिचगु Guchchupichchagu To be disordered Inconditum esse
	अगडु Agadu Fierce, untamed Ferox	अगडि Agadi A deceiver Fraudulentus	....	अगडु Agadu An accusation Criminatio
8	अगल Agala Broad Latum	अगलम् Agalum Breadth Latitudo	अकलम् Akalam Breadth Latitudo	अगलु Agalu To burst asunder Rumpere
9	अगळु. अगळि Agalu, agali To dig, a trench Fodere, fossa	अगऴि ; अगिऴ् Agazhi, agil A fort trench Arcis fossa	....	अगडु Agadu A trench, a moat Fossa
10	अज्ज Ajja Grandfather Avus	अतन् Atan Father Pater	अच्छन Achchhan Father Pater	अव्व Avva A grandmother Avia
11	अञ्चे Anche A relay, the post . Statio, veredorum statio	असै-दल Asaidal Motion, walking Ambulatio	अञ्चल् Anchal The post Cursores publici	अञ्चे Anche A relay, the post Statio, tabellarius

N. B. The Hindi अकडना, *to be cramped or shrivelled up, to strut*, &c.; the Canarese अक्कलिसु, *to contract, as the muscles of the stomach, from hunger*, and all the allied words in the other languages, are derived, it is conceived, from अकर्षण, *pulling, drawing*, &c., and are therefore here omitted. It is possible, indeed, that they may have had an independent origin in the ancient Indian vernacular tongue, but at any rate they are too closely allied in form and sense with the Sanscrit to find a place in this Vocabulary.

No. 8.—The Maráthi अगदो may I think be derived from the Canarese word for broad. It is a very common word, with a negative for *by no means*, and some have mistaken this for the meaning of the simple word. The Tamil of this No. is marked as if it were Sanscrit, whether supposed to be derived from अगाध, or from what other word I can only conjecture. There is no probability in such a derivation; च cannot pass into ळ.

No. 9.—The Maráthi term here forms a curious instance of the meeting of the two dialectic waves. अगळ, as used for *a bar*, is a corruption of the Sanscrit अर्गल, but as used for *a small pit*, a meaning quite unknown to the Sanscrit, comes from the Canarese अगळु, *to dig*. But see further on this point in No. 22.

SINGHALESE.	MARA'THI'.	GUJARA'THI'.	HINDI'.
.....	गचकों, गच	गच	गचपच
.....	Gachka, gach	Gach	Gachpach
.....	A jolt, tightly	Tightly	Stuffed together
.....	Concussio, strictim	Arctè	Compressum
.....	अगडबगड	अगडबगड	अगडबगड
.....	Agadbagad	Agadbagad	Agadbagad
.....	Jabber, trifles	Trash, trifling	Jabber, trifles
.....	Garrulitas	Nugæ	Nugæ
.....	अगदी	.....	.....
.....	Agadi	.....	.....
.....	In all its extent	.....	.....
.....	Prorsus.	.....	.....
अगल	अगळ,	.....	.....
Agala	Agal	.....	.....
A ditch, a trench	The little pit at marbles, &c.	.....	.....
Possa	Puteolus	.....	.....
आता	आजा	.....	आजा
A'tá	A'dzá	.....	A'já
A paternal grandfather	A grandfather	.....	A paternal grandfather
Avus paternus	Avus paternus	.....	Avus
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

N. B. Probably अड्डे. *a shop*, is a corruption of अड्न ; and अवडे. *assessment on land*, is from *Sans.* अक्षत. *dry grain* ; and many of the following words from *Sans.* अच्छ *pure*, whence also the Hindi अच्छा *good.* अड्डु is a corruption of अक्ष, *a mould, an axle-tree*, and has the same meaning, and probably, when used as a verb in the same sense, *paying unjustly, suffering loss*, &c. it is from the same word in the sense of *a die for playing with at dice.* The words for *types, printing*, &c. in the Southern tongues come chiefly from अक्ष, as in the Northern—they are probably derived from चप, *to pound*, giving us छाप &c.

No. 10.—The Burmese अत्से *(atse), an ancestor of the seventh degree upwards*, may here be added.

No. 11.—Probably the Sanscrit roots अच and अञ्च् have received the sense of *to go* from the Tamil, the root, which is properly अञ्च्. In the Tamil we have a large number of derivative words from this root, but I have not found one in the Sanscrit. The compilers of the Dhatu-manjari then, I feel confident, have in this instance, as in many others, given meanings to the roots which they have not in the pure Sanscrit.

No.	Canarese.	Ta'mil.	Malaya'lim.	Telinga.
12	अञ्चु Anchu To fear Timere	अचम, अञ्जल् Acham, anjal Fear Timor	अच्चम् Achcham Fear Metus	अञ्चेना Anchena An estimate Census
13	अटकु, अटतटि Ataku, atatati Hinderance, obstacle Impedimentum	अटि Ati Delay, hinderance Mora, impedimentum	अटेप्प Ateppa Obstacle Impedimentum	अटकावु Atakávu Prevention Obstructio
14	अडसट्टु Adasattu A conjecture Ariolatio	अडङ्गल्ल Adanggala A contract for work Pactio	अटङ्कल् Atangkal An estimate Æstimatio	अट Ata It is reported Aiunt
15	अट्टु Attu To abate, to be boiled dry Desiccari	अडङ्-क्कादु Adang-krradu To abate, to sink down Diminui, residere	अटङ्ङुन्नु Atangngunnu To be humbled, to abate Deprimi, reprimi	अङ्गु Adanggu To be depressed Deprimi
16	अटवणे Athavane Remembrance Recordatio	....	अटयालम् Atayálam A sign, a token Signum, nota	अडियालमु Adiyálamu A sign, a token Signum, nota
17	अडगु Adagu To be hidden Abdi, lateri	अडकम् Adakam Concealing, sepulture Occultatio, sepultura	अटक्कि-क्कुन्नु Atakkik-kunnu To cover, to conceal Tegere, celare	अड्डु Addu That which conceals, a cover Celator, tegmen
18	अडयु ; अड्डु- Adayu, addu- To have, bye- Habere, sub-	अडै-ग्रदु Adai-grradu To have, to be near Habere, propinquum esse	अटुत्त Atutta Near, belonging to proximè, illi pertinens	....

No. 12.—But for the Telinga, which joins the form of the Southern family with the meaning of the Northern, which have derived the word from the Persian آزمایش I should not have ventured to trace here any connection. Yet as آزآیش is also used in Persian, the Tamil and Persian roots are to all intents the same, and the radical ideas of trying and fearing are not irreconcileable.

No. 13.—The meaning in all the languages except the Singhalese is indentical. The word अटक, or अटकाव in this sense is to be found also in the Panjábi, Scindian, Uriya and Bengáli languages. This root must be carefully distinguished from the Sanscrit root अट, *to move, surpass*, &c., whence अट्ट *an upper room or attic*, and some other words, which also enter into the vernacular languages, are derived. It is also to be distinguished from the next No., the root of which is in the Telinga a verbal particle अट, *it is reported*, and therefore I have, for the connection, brought forward the Canarese word out of its

SINGHALESE.	MARA'THI'.	GUJARA'THI'.	HINDI.
?.....	अजमास	अजमाएश	P अजमाईश
.....	Adzamás	Azmáesh	Azmáish
.....	Estimate, conjecture	Trial	Trial, proof
.....	Æstimatio	Experimentum	Probatio
अट्टुव	अट, अटक ?	अटक. अटकाव	अटक, अटकाव
Aṭṭuva	Aṭ, aṭak	Aṭak, aṭakáva	Aṭak, aṭákava
A glutinous substance	Obstruction, hinderance	Oostruction	Stop, hinderance
Aliquid glutinosum	Impedimentum	Impedimentum	Cessatio, obstructio
.....	अटकळ	अटकलो	अटकल
.....	Aṭakaḷ	Aṭakalo	Aṭakal
.....	Conjecture, guess	Conjecture	Conjecture, estimate
.....	Conjectatio	Ariolatio	Conjectatio
अडुवेनवा	अटणे	.....	.....
Aḍuvenavá	Aṭṇe	.....	.....
To decrease	To be dried up	.....	.....
Diminui	Desiccari	.....	.....
अडयालम	अठवण	.....	.....
Aḍayálama	Aṭhavaṇ	.....	.....
A brand, a mark	Remembrance	.....	.....
Nota, signum	Recordatio	.....	.....
अडय	आड	आड	आड
Aḍaya	A'ḍ	A'ḍ	A'ḍ
A prop, a stopper	A well, shelter, cover, protection	Protection, shelter	Shelter, concealment
Adminiculum, obturamentum	Puteus, munimen	Munimen, refugium	Asylum, abditum
अडुत्तु	अड—*In composition*	आड—*In comp.*	.....
Aḍuttu	Aḍ-	A'ḍ-	.....
Belonging to	Bye-, spare	Less	.....
Alicui pertinens	Sub-, extra	Minor	.....

place. The Telinga word, however, is derived from अण, *to speak*, and in the Dhatu-manjari we have the meaning *to sound* given to this root, though not one of the Sanscrit derivatives has any connection with sound. Here again I suspect the author to have had the vernaculars in his eye.

No. 15.—Here the Hindi अटना follows entirely the Sanscrit sense of the root, and means *to be filled up*, a sense also found in some of the other tongues occasionally.

No. 17.—This is one of the instances that beautifully illustrate the necessity of studying the Southern languages to be able to see the derivation and full force of the words in the Northern. The same root appears also in the Panjábi अड्तला (aḍtalá) *shelter*, which is also Hindi, the Scindian अड (aḍ), and the Bengáli आडाल (aḍàla) in the same sense.

No. 18.—The अड here, in some of the languages, corresponds to the लघ of the Sanscrit, which in others has taken its place.

No.	Canarese.	Ta'mil.	Malaya'lim.	Telinga.
19	ಅಡವು, Aḍavu A deposit, a pawn Pignus	அடகு. Aḍagu A pawn, a pledge Pignus	അടമാനം Aṭamánam A pledge Pignus	అడ్డి, Aḍḍi A deposit Depositum
20	ಅಡಲು, Aḍalu To tremble, to fear Tremere, pavere	அடி Aḍi A stroke, a blow Ictus	അടി, Aṭi A blow, a stripe Ictus, plaga	అడలు, Aḍalu Fear, terror Timor, pavor
21	ಅಡಿ, Aḍi A foot, the bottom Pes, solum	அடி, Aḍi The foot, foundation Pes, fundamentum	അടി, Aṭi The foot, a footstep Pes, vestigium	అడుగు, Aḍugu A foot, a footstep Pes, vestigium
22	ಅಡ್ಡ, Aḍḍa Anything in a cross direction Ecquid transversum	அடம், அடனை Aṭam, aṭanai Across Transversè	അടുക്ക, Aṭukka A row, a layer Series	అడ్డము, Aḍḍamu Anything transverse Ecquid transversum

No. 20.—The Hindi डर here is probably derived from the Sanscrit द्र. The Southern influence then is confined to the change of द् to ड.

No. 21.—This number also traces an uncommon word in the Northern tongues to its source in the Southern. The Bengáli is the same as the Hindi, and the Scindian has अडि for *spurring*.

No. 22.—This is a truly aboriginal root, which runs through most of the Indian Vernaculars. The Scindian has for *transverse* आडो (áḍo), the Bengáli एडो (eḍo), the Uriya आड (aḍa).

N. B. I am not quite sure of the Malayálim here, but as the Canarese ಅಡ್ಡ ಚೌಕ *(adda-chouka) oblong*, is probably from this root, I think it should be admitted. What if the Sanscrit अर्गल *(argala)* a wooden bolt, of which no even plausible derivation can be given from Sanscrit roots, be a mere corruption of the Canarese ಅಡ್ಡಕೋಲು, (aḍḍakolu)

SINGHALESE.	MARA'THI'.	GUJARA'THI'.	HINDI'.
.....	अड़त,	आडत,	अड़त,
.....	Aḍat	A'ḍat	Aḍhat
.....	Mercantile agency	Agency, brokerage	Agency, commission
.....	Negotiorum procuratio	Procuratio	Procuratio
.....	डरकणे,	डर,	डर,
.....	Ḍarkaṇe	Ḍar	Ḍar
.....	To roar, to rave	Fear, dread	Fear
.....	Rugire, insanire	Timor, pavor	Timor
අඩිය,	एड,	एडो, एड	एडि, एड
Aḍiya	Eḍ	Eḍí, Eḍ	Eḍi, Eḍ
A foot, bottom	A spurring with the heel	The heel, spurring	The heel, spurring
Pes, solum	Calce stimulare	Calx, stimulatio	Calx, calce stimulatio
හරහව,	आडवा,	आडो,	आडा,
Harahava	A'ḍava	Aḍo	Aḍá
Crosswise	Transverse, adverse	Cross, crooked	Transverse, oblique
Transversè	Transversus, adversus	Transversus, flexus	Transversus, obliquus

a cross-bar of a door, derived from अड़? If it should turn out that many words have been admitted into the Sanscrit which are derived from the vernacular languages of Southern India, it will account for the prevalence of words, apparently Sanscrit, used among classes of the population where Brahmanical influence has scarcely been felt. When we remember, too, that Sankar Achárya, the great champion of modern Hinduism, was born in the Canarese country, this supposition appears the less improbable. In the present instance the word ಕುಣ್ಡು in Canarese means "*that piece of wood which projects from the inner edge of the leaf of a door, fitting into a socket, and serving the purpose of hinges.*" Now, the radical idea of the word when used as a verb, as given in the dictionary, is that of falling down; and the cross-bar in question is actually let fall down into its place inside of a bent piece of wood, or iron, fixed in the door, projecting upwards, and retaining it in its place.

ART. VI.—*Note on the Rock-Inscriptions in the Island of Salsette.* By the REV. J. STEVENSON, D.D.

Presented December 1851.

THE Cave Commission having obtained, by way of experiment, from Mr. Wilson, Paris-plaster Castes of the Inscriptions found on the rocks at Salsette, four of which are in Pali and one in Sanscrit, I have been examining the Pali ones, and here give the following transcript in Devanágari, and attempt at translation of two of them. They seem to contain nothing of peculiar interest, yet, when the whole of the Inscriptions on our rocks shall have been carefully examined, an interest may be reflected on those which seem at present wholly unimportant. For the sake, then, of future antiquarians, it is best to omit nothing, but to endeavour to render all of them generally intelligible as far as possible.

The first then is as follows* :—

सेापारेागाणगम ससमीकपसक सपेाढी देयधम

Translating this into Sanscrit it will stand thus:

सेापारेागाणेांगमस्य समीक्षप्रसक्तस्य तडदायधर्मः

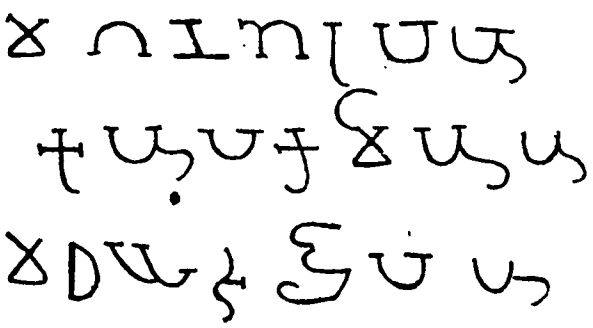
A Tank, the charitable gift of him who, devoted to Intellect, has crossed over the Waters of Affliction.

In this rendering I have translated all the words, but perhaps *Samikshaprasakta*—"Devoted to Intellect" is a proper name, and not an epithet. The word पेाढी is attended with much difficulty. A word very like it in the Junír Inscriptions, copied by Colonel Sykes, by Prinsep (Journal As. Soc. Bengal, Vol VI., p. 1044) is made षढी, a word which he derives from a rare Sanscrit term षड्ः *water*. Before I noticed this, however, I had arrived at the reading I have given, and on examining the inscription anew, I found that I could not change it. Almost in despair about what to make of this word, I turned up the Maráthee Dictionary, rather to be able to feel satisfied that I could

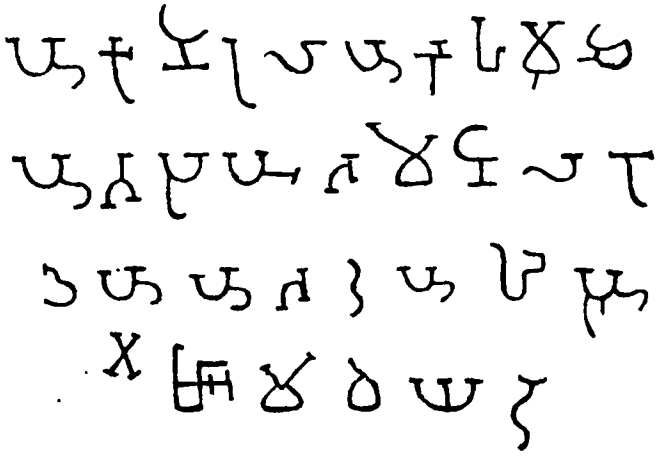
* For the Facsimile, see Pl. V. No. 1.

Fac-similes of Rock-Inscriptions in the Island of Salsette

No 1.



No 2.



arrive at no satisfactory conclusion, than from any hope of finding a clue to a word I had never heard used, when I found both पोंढो and पोंढा. It is the sense given to the latter, however, that of "a receptacle for water," which suits our context, and this, I have no doubt, is the meaning of the term here, as the Inscription is over a tank.

In reference to the word देय there is no doubt of the reading, but it is interchanged with दय in other Inscriptions, so that it may be taken here as दय—"compassion," an attribute of the Buddhist religion, as it is also of the Jain, since no offering can be presented to a superior being that gives pain to any animal. The reason of such a designation is not very evident at present, but must have been striking enough when the Brahmans, following the ritual of the Vedas, were in the frequent habit of offering horses, and other animals, even the sacred cow, to their gods. I am rather of opinion still, however, that here it is to be taken in the sense of दाय, as दान, which means the same thing, is to this day often coupled with धर्म by the Maráthas, in the way that देय is here. I think we shall find as we proceed in examining these Inscriptions that we must look more to the provincial dialects of the different localities than we are often inclined to do, and less to the Sanscrit.

The second Inscription* is—

क्षेमलकस हेरणिकस रोहणिमितसपुतसस लासदतस सेटा देयधम

In Sanscrit,

क्षेम लक्षस्य हैरण्यकस्य रोहिणिमित्रस्यपुत्रस्य मुञ्जासदत्तस्य सस्थिक दायधर्मः

The charitable gift of a Svastika Temple by Súlasadata, son of Rohanimita, the goldsmith, whose eye is directed to prosperity.

In this Inscription there is not much difficulty. The first word in the original, and last in the English, may be read so as to mean "who is fated to prosperity," for लक means a "forehead" in Sanscrit, but I prefer changing it into the more common word लक्ष, which the analogy of the languages does not forbid. Rohinimitra is a name of Chandra, the deified Moon. In the Concan it is customary to drop the short इ in the middle of words, and so it happens in this word. The only difficult word is सेटा, of which the reading can hardly be doubtful. I have taken it as synonymous with Svastika, a particular kind of temple. The figure Svastika, which immediately follows the Inscription, seems to indicate as much, although it is of frequent occurrence in Inscriptions, and much stress cannot be laid upon it.

* For the Facsimile, see Pl. V. No. 2.

The word *Svastika* itself implies rest and comfort of body and mind. चोट in Maráthi, among other things, means "a causeway, or paved road, made up a steep ascent." I shall have to see, by a minute personal inspection, whether the Inscription is connected with a temple, or near such a road, before I decide finally between the two.

ART. VII.—*Extracts from the Proceedings of the Society for the Year* 1850-51.

MEMBERS ELECTED.

FROM 10TH DECEMBER 1850 TO 25TH NOVEMBER 1851.

Lieut. Col. Blood. Captain M. Taylor.
A. Rimington, Esq. J. N. Rose, Esq.
Major Delhoste.

PRESENTS TO THE LIBRARY.

	DONORS.
ANALYSE der in Anquetil Duperron's uebersetzung enthaltenen Upanishad, (from Weber's "Indische Studien")	Professor Weber.
BAHLOL (Munshi), Geographical Description of the Panjab, in Panjabi, translated from the Persian	Sir H. M. Elliot, K. C. B.
BEKE (C. F.), Enquiry into M. Antoine D'Abbadie's Journey to Kaffa, to discover the Source of the Nile	The Author.
———Reasons for returning the Gold Medal of the Geographical Society of France, and for withdrawing from its Membership, in a letter to M. De la Roquette	———
BUDHIVARDHAK HINDU SABHA, in Guzerati....	Gungadass Kessendass.
CASSELS (W. R.), Eidolon, or the Course of a Soul, and other Poems.	C. Peel, Esq.
CASSIM (Meer Abdool), Hoodee-kat-ool Aulum (The Garden of the World).	Seraj-ool-Moolk.
CASSIN (H.), Official, Descriptive, and Illustrated Catalogue of the Grand Exhibition, Parts I. to IV.	The Author.

	DONORS.
CHRONOLOGICAL TABLES, containing Corresponding Dates of the different Eras used in the Bombay Presidency.....	Govt. of Bombay.
CHURCH MISSIONARY RECORD, No. II., for 1850, and Nos. II. V. VI. IX. X. for 1851.....	Rev. C. Isenberg.
CIRCULAR ORDERS of the Sudder Dewanee Adawlut.....	Govt. of Bombay.
DALZELL (N. A.), Contributions to the Botany of Western India, contained in Hooker's Journal of Botany and Kew Garden Miscellany, Nos. 13, 15, 16, and 18 to 32, inclusive.....	The Author.
———(P. M.), Monthly Statements of the External Commerce of the Presidency of Bombay, from December 1850 to August 1851..	———
DICTIONNAIRE DE L'ACADEMIE FRANÇAISE, Revu, Corrigé, et Augmenté, 2 Vols.	Hon'ble J. P. Willoughby.
DIXON (Col.), Sketches of Mairwarra.....	The Author.
DYER (G.), History of the University and Colleges of Cambridge	Hon'ble J. P. Willoughby.
GOVINDJI NARAYN, Domestic Reform among the Hindus. Evils of Debt. Treatise on Cleanliness. In Maráthi.....	The Author.
GRAMMAR of the Panjabi Language	Sir H. M. Elliot, K. C. B.
JOURNAL of the Indian Archipelago and Eastern Asia, Nos. 9 to 12 of Vol. VI. for 1850, and Nos. 1 to 8 of Vol. V. 1851.....	The Editors.
———Nos. 9 to 12 of Vol. IV. for 1850, and Nos. 1 to 4, 6 and 8 for 1851	Govt. of Bombay.
KHALID (U. F. M.), The Soorah, a Dictionary of Arabic Words explained in Persian	J. S. Law, Esq.
MACKAY (C. F.), Western World, or Travels in the United States in 1846-47.....	The Author.
MAP of Cutchee and the North Western Frontier of Sindh, including the Murree and Boogtee Hills	Hon'ble J. P. Willoughby.
MAP of Borneo.....	Govt. of Bombay.
MCCLELLAND (J.), Report of the Geological Survey of India for the Season of 1848-49.	The Author.

	DONORS.
MOOHUMMUDAN LAW of Sale, according to the Hunefeea Code, translated by N. B. E. Baillie.....	Govt. of Bombay.
MAURY (Lieut. M. T.), Wind and Current Charts.....	The Author.
NOWROZJI FURDONJI, Tareekh-i-Zurtoshtee, or Discussion on the Era of Zurtosht, or Zoroaster, the Prophet of the Parsees.....	The Author.
OBSERVATIONS made at the Magnetical and Meteorological Observatory at Hobart Town, in Van Dieman's Land, under the Superintendence of Lieut. Col. E. Sabyne.....	Govt. of Bombay.
OBSERVATIONS made at the Magnetical and Meteorological Observatory of Bombay, for the year 1847, under the Superintendence of C. W. Montriou, Commander I. N.....	———
PERRY (Sir E., Kt.), Letter to Lord Campbell, Lord Chief Justice of England, on Reform in the Common Law, with a letter to the Government of India on the same subject.....	The Author.
PRINSEP (J.), Modification of the Sanskrit Alphabet, from 543 B. C. to 1200 A. D.	———
RADICALS of the Sanskrit Language.....	Hon'ble J. P. Willoughby.
REPORT of the Elphinstone Institution for the year 1850.....	The Principal.
REPORT of the Civil Cases determined in the Court of Sudder Dewanee Adawlut for 1848-49, compiled by A. F. Bellasis, Esq., B.C.S.	Govt. of Bombay.
———of the Bombay Engineers, for the Official Year 1848-49.....	———
———of the Board of Education, for the year 1849, No. VIII.....	———
———of the Grant Medical College, Session Fifth, 1851.....	Dr. Morehead.
———of the Dekhan Vernacular Translation Society.....	The Society.
———of Crime and Police Administration of the Zillahs subject to the Bombay Presidency...	Govt. of Bombay.

	DONORS.
RIG-VEDA-SANHITA, the Sacred Hymns of the Brahmans, together with the Commentary of Syanacharya, Vol. I., edited by Dr. Max Müller.	Hon. the Court of Directors.
SOCIETY, Royal Astronomical, Proceedings, No. 8 of Vol. X. for June 1850; Nos. 1 and 2 of Vol. XI. for 1850; Nos. 3, 4, 5, and 8 Vol. XI. for 1851	The Society.
———Memoirs, Vol. XIX., for 1849-1850	———
———American Oriental, Journal of, No. 4, Vol. I.	———
———Ceylon Branch of Royal Asiatic, Journal of, for November 1851	———
———Monthly Notices of, from November 1849 to June 1850, Vol. X	———
———NATURAL PHENOMENA. Translated into Maráthi by Govindji Narayn.	Dec. Vernac. Soc.
SYKES (Lieut. Col.), Mortality and chief Diseases of the Troops under the Madras Government, European and Native, from the years 1842 to 1846, inclusive.	The Author.
WAENEN (C. V.), Sententi Ali Ebn Ali Talebi Arabice et Latine, annotationibus illustravit. Vol. I. 4to	Hon'ble J. P. Willoughby.
WEBER (Dr. A.), Indische Studien, Beitrage fur die kunde des Indischen Alterthums	German Oriental Society.
WIGHT (W.), Icones Plantarum Indiæ Orientalis, or Figures of Indian Plants, Part I. Vol. V.	Govt. of Bombay.
WILSON (Revd. Dr.), Idiomatical Exercises, illustrative of the Phraseology and Structure of the English and Maráthi languages.	The Author.
ZEITSCHRIFT der Deutschen Morgenlandischen Gesellschalft. Vierter Band. 1st III. and IV., Heft of 1850, and II. Heft of 1851	German Oriental Society.

TO THE MUSEUM.

	Donors.
Antelope Cervicapra (male), skin of white variety.	Capt. G. G. Malet.
Bombyx Paphia, with eggs and cocoon, from Sawunt Warree	Major LeG. Jacob.
Birds' Skins, from the Neilgherry Hills. Genera Temnurus, Dicrurus, and Oriolus	Capt. Montriou.
Birds' Skins, from the Forests of Cannanore	J. S. Law, Esq.
Boats, Native Models of, in use on the River Indus: No. 1, Jamptee; No. 2, Zoruck; No. 3, Doondee. Built in the Flotilla-yard at Kotree	Govt. of Bombay.
Bones, Teeth, &c., with Matrix, from a Conglomerate discovered by Dr. Wilson, about two miles from Gogha, on the road to Rajcote	Rev. Dr. Wilson.
Bos Frontalis (male and female), skulls of	Major LeG. Jacob.
Cephelopoda, Gasteropoda, Conchifera, Echinoderma, Zoophyta, and Foraminifera, a collection of fossil remains of, from Lower Scinde.	H. J. Carter, Esq.
Coin, Silver, (one,) called *Shurree Lhuree*	H. B. Frere, Esq.
Crystalline Sulphur, from the Island of Ormuz	Lt. C. G. Constable.
Encrustation, specimens of, which takes place between the tubes in the boilers of Steam-vessels plying in the Indian Ocean	J. Ritchie, Esq.
Eschara and Balanus, specimens of, taken from the keel of one of the Peninsular and Oriental Company's Steamers	
Geological Specimens, collection of, from the Rocks on the South Concan	N. A. Dalzell, Esq.
Gypsum from the Persian Gulf	Capt. J. Estridge.
Ibex, Horns and Skull of, killed near Kalilah Hill, in the vicinity of Bushire	Capt. Montriou.
Images, Heathen, (four,) sculptured in Trap, from Bajalcote and Oogurgole, in the Purutghur Talooka, and Purutkul, in the Hoogoond Talooka	W. E. Frere, Esq.
Lion, Lioness, and Wild Ass, skulls of, from Kattyawar	Capt. E. E. Malet.
Limestone, black, and white Calc-spar, from Ras Massandam	Lt. C.G. Constable.

	DONORS.
Marble, white, from Kattyawar.....	Capt. H. Aston.
Minerals, collection of, from the neighbourhood of Malligaum.....	Lt. A. Aytoun.
Otis Houbara, and Gallus Sonneratii, skins of...	Major LeG. Jacob.
Pholadine Tubes, casts of, from the Sandstone near Kurrachee.....	Dr. Don.
Shells, from a raised beach in the Island of Kishim.....	Lt. C.G. Constable.
Trap from Salsette, and from the Tunnel of Sattara.....	Capt. J. Estridge.
Zeolites and Calc-spar, from the Trap-rock of Baboola Tank.....	G. Buist, Esq.

ORIGINAL COMMUNICATIONS.

	COMMUNICATED BY
Bradley, (Dr. H.,) Rock-cut Caves of Aurungabad.—14*th August* 1851. *(a)*.....	General Fraser.
Carter, (H. J., Esq.,) Geographical Description of certain parts of the South-east Coast of Arabia, to which is appended a short Essay on the Comparative Geography of the whole of this Coast.—20*th March* 1851. *(b)*.....	The Author.
———Memoir on the Geology of the South-east Coast of Arabia.—9*th October* 1851. *(c)*..	———
Gibson, (Dr. A.,) Notice of a Hot Sulphureous Spring at the Lukkee Pass, and of a Saline Spring under the Fort of Kal-Droog, in the Mahim Talooka, with specimens of their waters respectively.—22*nd May* 1851. *(d)*.	———
Jacob, (Major LeG.,) Facsimiles, with Interlinear Balbodh Transcripts, and English Translations, of three Copper-plates, connected by a Ring and Seal (Buddh). The Plates are ten and a half inches broad, and half an inch thick, and were obtained from a Jain in Kharepatan, a Town on the river Viziadurg.	

(a) To appear in the General Abstract of the Cave-temple Commission.
(b) See last No. of Jl. p. 224. *(c)* This No. p. 21.
(d) See this Art. Proceed. Offic. Lit. and Sc.

	COMMUNICATED BY
The Inscriptions are dated Shak 910, equivalent to A. D. 988.—*20th March* 1851. *(a)*.	The Author.
Stevenson, (Revd. J., D.D.,) Observations on the Grammatical Structure of the Vernacular Languages of India, No. 3, The Adjective.—*20th February* 1851. *(b)*.....	———
———Ditto ditto No. 4, The Pronoun.—*14th August* 1851. *(c)*....	———
Taylor, (Captain M.,) Further Information on the Kistvaens, Cromlechs, Cairns, &c., near Ferosabad, on the Bhima, also Sketches of the Groups at Rajan Koloor, Jewarjee, and Yemmee Good.—*20th March* 1851. *(d)*..	———
Twemlow, (Col.,) Notices on certain Ancient Caves and Structural Buildings near Aurungabad.—*20th March* 1851. *(e)*.....	Govt. of Bombay.

PROCEEDINGS, OFFICIAL, LITERARY, AND SCIENTIFIC.

The Government letter No. 106, in reply to the Society's letter No. 183, dated 14th December last, respecting a further search for Cave-temples and monuments of antiquity, &c. in the territories under the Bombay Government, and the employment of an artist to illustrate those of Elephanta, authorises the Society to advertise in the *Government Gazette* the offer of rewards of from Rs. 25 to Rs. 100 for information respecting any set of Caves hitherto undescribed, the reward to be proportioned to the value and importance of the discovery; also sanctions, at the request of the Society, rewards of Rs. 100 and Rs. 20 respectively to the parties who brought to notice the Excavations of Kuda and Khondana, and those in the Garodi Hill.

The proposition for reducing the Subscription of Subscribers from Rs. 100 to Rs. 50 was then brought forward, and, after a lengthened discussion, lost, under Art. XVIII. of the Society's Regulations, which requires a majority of two-thirds of the Members present to decide any question for which they may not provide.—*23rd January* 1851.

(a) To be inserted in next No. *(b)* See last No. p. 196.
(c) This No. p. 15. *(d)* Returned at the Author's request for additions.
(e) To appear in the General Abstract of the Cave-temple Commission.

Some beautiful specimens of Calc-spar and Selenite were laid on the table, which had been obtained during the excavation of a well in the centre of the Native town. These had been formed in the cavities of trap rock. They were sent for the inspection of the Society by Dr. Buist, accompanied by a letter, containing a section of the well from which they had been taken. Dr. Buist observes, that it would be a great help to obtaining a knowledge of the Geology of Bombay, and a great advantage to geological science generally, if the Government and the Board of Conservancy would call for geological sections of all excavations and tunnelling executed under their orders.—*20th February* 1851.

With reference to Government letter No. 966, dated 6th instant, and its accompaniments, consisting of a copy of a letter from H. B. E. Frere, Esq., Commissioner in Scinde, and one also from Captain A. B. Rathborne, forwarding a metallic cup, with silver and copper coins, dug up at Hyderabad, it was resolved that the whole should be delivered over to the Revd. Dr. Wilson, for examination.

It was moved by the Hon'ble J. P. Willoughby, President of the Society, and seconded by Major G. LeGrand Jacob, that a subscription be again opened for reprinting in England, in an 8vo. form, with the plates, on thin paper, the three volumes of the Transactions of the Society; and that the Members of the Society be invited to enter their names as subscribers for one or two copies; these volumes, better known as the "Transactions of the Literary Society of Bombay," being out of print, and in much request. The motion was carried, and the Secretary requested to act accordingly.

Dr. Wilson directed the attention of the Society to a critical edition of the whole of the Zend Writings, at present preparing by one of its Honorary Members, Professor N. L. Westergaard, of Copenhagen, who a few years ago had visited this country and Persia, for the express purpose of prosecuting Oriental research, and had gained the respect and affection of all who had an opportunity of making his acquaintance on that occasion. In forming his text, this learned gentleman, according to the prospectus issued by him, had secured the use of the Zend Manuscripts in the libraries of Copenhagen, Paris, London, and Oxford; those belonging to MM. Burnouf and Wilson, and those acquired by himself in his journeys in the East. His work is to appear in three volumes, of which the first is to contain the text of all the Zend writings; the second, a comparative Grammar of the two dialects in which it has been ascertained they are composed, and a complete Con-

cordance of the Zendavesta; and the third, a new translation in English of the Zend text. Dr. Wilson added that he considered Mr. Westergaard's researches in the Zend literature of the highest interest and importance. Mr. Westergaard, on returning his manuscripts to him, had said, "I hope that the shape of my types will meet with your approbation. They are cut according to the oldest existing manuscripts. I have promised, in the French announcement, to give a Grammar of the two dialects of the Zend language. It is not difficult to distinguish between them, especially aided by the oldest manuscripts, as the difference is very strong, and observed not only in the use of different words, or different forms of the same word, but even in the grammatical structure. As the Zend language must be referred to the Eastern parts of Iran, I hazard resting, among other facts, on the authority of Straled about the difference of the dialects of Bactriana and Sogdiana, to assign to our two dialects the names of Bactrian and Sogdian, in such a way that I should call with the name of Sogdian that dialect in which the greater part of the Yacshna is composed, as it is evidently more rude and unpolished than that of the other parts of the Zendavesta." Of the differences in the dialects here referred to, Mr. Westergaard in his communication had furnished many examples. He had also submitted to Dr. Wilson his scheme for re-adjusting the Zend alphabet, founded on a comparison of it with the Sanskrit and Greek alphabets; and had promised to notice in other letters (the substance of which Dr. W. would be happy to communicate to the Society) the general results of his researches.

With reference to the communication made by Dr. Wilson in behalf of Professor Westergaard, it was moved by the Hon'ble Mr. Willoughby, seconded by Major LeGrand Jacob, and unanimously resolved, that the Society subscribe for five copies of Mr. Westergaard's forthcoming work, in token of the interest which they feel in his important researches, and their pleasing remembrance of his visit to India.

The Revd. Dr. Stevenson, Vice-President, moved, on behalf of the Cave-temple Commission, "That the attention of the Society having often been drawn to the subject of the inscriptions engraved on the rocks and in the Caves of Western India, and more especially lately in a paper by our associate Sir Erskine Perry, the Government be applied to for the purpose of appointing an Agent to copy accurately and take impressions of all these inscriptions, under the superintendence of the Cave-temple Commission." This proposition was adopted by the Meeting.

A letter was read from Dr. Buist, containing a geological section of

a well sunk at Cochin, on the sea shore, under the directions of General Cullen. The excavations had been carried to the depth of 40 feet, and the strata passed through were successively, from above downwards,— 1, ferruginous clay; 2, a variety of laterite, or new red sandstone? 3, lithomargic clay; 4, blue clay; 5, lignite; 6, sandy clay; 7, calcareous clay, or marl; 8, compact dolomite limestone, with organic remains. Dr. Buist considers this "variety of laterite" not to be a part of the laterite formation, but to be a bed of red indurated sand, corresponding to the littoral concrete of Bombay; and therefore that the lignite, copalite, &c. found next it, does not, as before supposed, lie under the laterite, but, probably, as General Cullen suggests, under "new red sandstone?"—*20th March* 1851.

A letter dated 17th March 1851 was read from Sir Henry Elliot, Secretary to the Government of India, with the Governor General, forwarding copy of one in which the Most Noble the Governor General has been pleased to direct that Dr. Flemming should be instructed to furnish a series of specimens, illustrative of the mineral resources of the Punjab, to the Asiatic Societies of Calcutta and Bombay.

The Government letter No. 1520, dated 12th ultimo, forwards the following copy of one (No. 14 of 1851) from Captain Meadows Taylor, of the Nizam's Service :—

No. 14 of 1851.

From Captain Commandant M. TAYLOR,

On special duty, Shorapoor,

To C. J. ERSKINE, Esq.,

Deputy Secretary to Government, Bombay.

Sir,—I have the honor to acknowledge the receipt of your letter of the 9th ultimo, No. 136, together with the copy of Dr. Wilson's Memoir on the Cave-temples of Western India which accompanied it.

2. I beg you to do me the favor to communicate the expression of my sincere thanks to the Right Hon'ble the Governor in Council, for his courtesy in transmitting to me this interesting memoir; and I have only to regret that there are no Cave-temples in the district under my authority to afford me the opportunity of obeying his Lordship's wishes.

3. The most curious remains I have found in this district are those which appear to be Druidical, or Scythic-Druidical, and which, whether as Cromlechs, Kistvaens, Cairns, or Barrows, have the closest resem-

blance to European Druidical remains. On this subject, I have recently written to Dr. Wilson an account of such discoveries as I have been able to make in the Shorapoor district, and included with them an account of some similar remains at a village in the Kanakagheree districts, near the Toombudra, which was visited at my request by a friend, the Revd. G. Keis, of the German Mission.

4. It is known that these remains exist in large numbers on the Neilgherries, and in regard to which a valuable and interesting paper by Captain Congreve, of the Madras Artillery, appeared in the "Madras Journal of Literature and Science," No. 32, and they have also been noticed in some parts of Mysore. I have no knowledge of their extending northwards further than the Bheema in this district; but as they extend to the Toombudra to the South, it is desirable, perhaps, to endeavour to trace them further, and I would recommend that the Collectors of Dharwar, Belgaum, and Sholapoor, the Officers of the Revenue Survey, if any, in those districts, the Political Agent in the Southern Mahratta Country, and the Commissioner of Sattara, be requested to institute inquiries as to the existence of any similar remains in their several jurisdictions, and to examine their contents.

5. I will not enter upon a detailed description of these remains, having so recently written to Dr. Wilson on the subject for the Asiatic Society, but it may be fitting to mention that I find them of four kinds—

1st, *Cromlechs.*—Erections consisting of three large slabs of stone set edgeways in the earth, with one large slab as a covering: one side, usually the South, is open. These erections vary much in size; the largest slabs I have seen are about 12 feet long, 8 to 10 feet broad, and 1½ thick. They do not contain any remains.

2nd, *Kistvaens, or closed Cromlechs.*—These are similar to the others, only that all four sides are closed; and usually in the South slab, about the middle, is a round hole, from 6 to 9 inches in diameter. These contain earthen vessels filled with earth, calcined human bones and ashes, mixed with charcoal.

3rd, *Cairns.*—Circles of stones, double and single, surrounding small *tumuli:* when opened to a depth of 8 to 12 or 14 feet, stone chests, composed of slabs of stones, are found, containing skeletons, accompanied by remains of spear-heads, and other weapons, earthen vessels, &c. In others, larger vessels, containing human bones and ashes, with charcoal, similar to the kistvaens, and no stone chests.

4th, *Barrows.*—These are larger than cairns, and consist usually of several cairns, or one large one, surrounded by others, as at Shapoor.

6. The vessels in these cairns &c. are all of the same character,—strong earthenware, with a bright red glaze; some have a black glazing also, some are half red and half black. It is worthy of remark that vessels of the same colour are found in these remains in Europe, and on the Neilgherries.

7. I have written privately on this subject to Bellary, and to a friend in the Mysore Commission, whose district adjoins Bellary, and shall hereafter do myself the pleasure to communicate any discoveries which may be made.

8. As the subject is of considerable antiquarian interest, in consequence of the coincidence of these remains and those of Europe, I trust I may be excused for directing such particular attention to them; but it is very desirable that they should be traced as far as possible, with a view to define the boundaries of the expeditions in India of this probably nomadic tribe.

9. It would also be curious to trace whether any of these remains exist in Cutch, Guzerat, or Khandeish, as well as in the Northern part of the Dekhan. Notice might also be given of the subject in Scinde, and if remains exist there, they might possibly be traced onwards, though this is a mere hypothesis.

10. The only other objects of antiquity in the Shorapoor district are the inscriptions in old Canarese which exist at Sirwal, Yeoor, Kembhavee, and other places where ancient Singum temples exist. I have understood that these have already been included in the collections of Mr. Walter Elliott, of Madras, and I have referred to him for information: should they have escaped him, I shall do myself the honor of transmitting them to the Society.

I have, &c.,

(Signed) MEADOWS TAYLOR, Captain,
On special duty, Shorapoor.

Shorapoor Districts, Camp Jourghee,
27th February 1851.

The Secretary stated that a subscription list had been opened, according to the request of the Society, for reprinting the "Transactions of the Literary Society of Bombay" in an 8vo. form, which Messrs. Longman and Co. had agreed to do if one hundred subscribers at Rs. 20 each could be obtained, and that sixty-four copies had already been subscribed for. The Society then requested that non-resident Members should also be invited to subscribe, and the community generally.

Major LeGrand Jacob moved for discussion at the next Meeting,

—"That measures be taken by the Society for the recovery, if possible, of the Inscriptions alleged to have been removed from the Temples of the Sun and of Somnath, in the Guzerat Peninsula, by communication to the parent Society, by notice in the papers, and in other suitable modes." Major Jacob stated that as the local tradition was prevalent that the slabs containing the Sais Inscriptions were taken from the temple by gentlemen, they might probably be now deposited in some public or private Museum, and every year that passes without endeavouring to regain them only adds to the risk of again connecting them with the history of the country.—*24th April* 1851.

The following letter from the Hon'ble J. P. Willoughby, Esq., late President of the Society, tendering his resignation, was read :—

"To H. J. CARTER, Esq., Secy. B. B. R. A. S.

"SIR,—In consequence of my approaching return to Europe, I beg that you will do me the favor of intimating to the Society my resignation of the office of President, and at the same time express to the Society the deep and warm interest I shall always feel in its prosperity, and in the success of its endeavours for the advancement of literature and science in India.

"I have the honor to be, &c.

"*Bombay, 25th April* 1851." (Signed) "J. P. WILLOUGHBY.

The Revd. Dr. Wilson, Honorary President of the Society, seconded by W. E. Frere, Esq., then proposed the following Resolution :—

"That the Society, on accepting the resignation of its President, the Hon'ble J. P. Willoughby, Esq., beg to express to him their best thanks for the ability and courtesy with which he has uniformly discharged the duties of the chair; the valuable assistance he has so frequently rendered the Society; and the great interest which, during many years, he has taken in its various proceedings."

This resolution was carried unanimously, and the Secretary requested to communicate the same to Mr. Willoughby by the following mail.

The letters Nos. 1808 and 1830 of 1851, from J. G. Lumsden, Esq., Secretary to Government, General Department,—the former sanctioning the employment of Mr. Fallon, Portrait Painter, &c. for twelve months, to illustrate the Caves of Elephanta, and the latter requesting the Society to propose some one to copy and take impressions of the Cave-temple and other ancient Inscriptions throughout the Presidency,

having been acted upon by the Cave-temple Commission, the Secretary stated that Mr. Fallon had already been engaged a month at Elephanta in the way mentioned, and that a party had been proposed by the Commission to Government for copying the Inscriptions, &c.

Letter No. 1832 of 1851, from J. G. Lumsden, Esq., forwards copy of a letter No. 4, idem, from Captain Kittoe, (Architect, Benares College, and Archæological Engineer, Bengal,) to the address of Government, in reply to one received from the latter with a copy of Dr. Wilson's "Memoir" on the Cave-temples, &c.; also a printed copy of some articles written by Captain Kittoe on the Caves of Gya, and other Antiquities of the province of Behar; together with an Address to the President and Members of the Bombay Branch of the Royal Asiatic Society, from Captain Kittoe, respecting the necessity for all engaged in archæological research to communicate regularly with each other, and to interchange copies of Inscriptions as well as drawings, particularly of Idols and of architectural features, as well as notes on the same.

The address, after having been read to the Society, was directed to be handed over to the Cave-temple Commission; and a copy of each No. of the Society's Journal, as it is published, to be forwarded to Captain Kittoe, that he might be informed of what the Society is doing in this respect.

The Secretary having stated, with reference to reprinting the three volumes of the Literary Society's Transactions, that there were subscribers for 65 copies, was requested to invite the non-resident Members to join in the subscription, and the community generally;—100 subscribers at Rs. 20 each being required to make up the cost of the reprint.

A letter was read from Mr. Fallon, dated Elephanta, 19th ultimo, calling the Society's attention to the flooding of a part of the Caves which will follow the late removal of earth from the Eastern side, and which will render the Caves most unhealthy during the fair season; also suggesting that it might be easily avoided by cutting a trench from the part where the water will collect to the declivity of the rock.

The Secretary was requested to forward a copy of Mr. Fallon's letter to Government, stating the desirableness that these Caves, already so notoriously malarious, should be rendered as healthy as possible, not only for the sake of enabling Mr. Fallon to complete his illustrations of them, but for the sake also of people who may hereafter visit them as a matter of curiosity.

The following alterations in the Society's Rules, proposed by Captain French, seconded by Captain H. Barr, were submitted for discussion at the next meeting:—

1st. That in lieu of the words "One hundred Rupees" and "Thirty Rupees" in Article XXI. of the Rules, "Rs. 50 and 12" be inserted, as the Annual Subscription of resident and non-resident Members respectively in future.

2nd. That the above shall not affect the present Members of the Society in the current year, but be applicable solely to the new Members, and all Members for the year 1852.

3rd. That in consideration of the present wants of the Society, and the anticipated increase to its Members, should the first proposition be carried, an Assistant Secretary, on a salary of 100 Rs. per mensem, be sanctioned, he however always being an Ordinary Member of the Society.

Dr. Gibson's communication (p. 140) was then read. The hot springs at the Lukkee Pass, in Scinde, are stated to issue from limestone: they are sulphureous, and the degree of their temperature varies.

That at Kal-Droog, in the Northern Concan, flows from the trap; its temperature is 130°, and taste strongly saline. With the exception of this one, Dr. Gibson has not met with any springs from Kandeish and Surat southward to Rajpoor, impregnated with saline matter; but has heard of one in the vicinity of the last mentioned, viz., at Vehlolee, near Dysar, in the Bassein talook, which he recommends visiting. The Vaziriabhoy spring is not saline. He also alludes to the intermittent cold springs "at Rajapoor, in the Southern Concan; and to a hot spring at Rajapoor, in the low valley which encloses the river; the former are situated on the slope of an adjacent hill, and are stated to be only active during part of the year; they are also said to burst out from May to July, and to continue running from three to four months.—*22nd May* 1851.

Election of President.

The Hon'ble Sir Erskine Perry, Knight, Chief Justice of Bombay, having been proposed by the Revd. Dr. Wilson, Honorary President, seconded by Roderick Mackenzie, Esq., was unanimously chosen to fill the vacant office of President, caused by the departure to Europe of the Hon'ble J. P. Willoughby, Esq.

It was resolved that a deputation, consisting of the Revd. Dr. Wilson, Professor Harkness, and the Secretary, should wait upon Sir Erskine Perry, to request his Lordship to do the Society the honor to accept its Presidentship.—*12th June* 1851.

The Hon'ble Sir Erskine Perry, having accepted the office of President, expressed his thanks to the Society for his election.

Captain French brought forward his propositions for reducing the Subscriptions of resident and non-resident Members, recorded in the Minutes of last Meeting, which were not carried, 19 having voted for, and 23 against them.

Professor Harkness, seconded by Captain Estridge, proposed, for consideration at the next meeting,—"That no question once disposed of by a vote shall be again brought forward for discussion within twelve months."—*17th July* 1851.

Professor Harkness brought forward his motion, recorded in the Minutes of the last Meeting, and A. Malet, Esq., seconded by the Rev. Dr. Wilson, Honorary President, moved as an amendment—

"That no alteration in the Rules of the Society be made, except at an Anniversary Meeting, or at a Special Meeting, by a majority of the resident Members."

Professor Harkness then withdrew his motion in favor of the amendment, which, having been put to the Society, was carried by nearly all present.

A. Malet, Esq., moved for consideration at the Anniversary Meeting:—

"That Subscribers be admitted under direction of the Committee of Management at Rs. 24 per annum, paid half-yearly in advance, which shall entitle them to read in the Society's Library, and to take out one work at a time, but not to have works circulated to them.

"Should the work consist of more than three volumes, or should a larger number of books be required by the Subscriber, the Committee of Management to have the discretionary power of complying with their request."

Captain French intimated his intention to move at the next meeting—

"That a printed Catalogue of the works added to the library, with the cost of each, (if purchased,) since the last Annual Meeting, be yearly laid on the table, and a copy sent to every Member, resident and non-resident."

On the application of Dr. Wilson, the Society agreed to present to the University of Leipzig, through Dr. Grant, who lately visited Bom-

bay, one of the remaining copies of the lithographed edition of the Vendidad and Liturgical works of the Parsís, with the Gujaráti translation of Framjee Aspandiarji. The learned establishment at this place, Dr. W. stated, had been overlooked, when copies of these works were formerly sent to Europe; and it is entitled to the courtesy of a presentation copy, not only from its own importance, but from the research of its present Sanskrit Professor Brockhaus, who has lately published an edition of the Vendidad, &c. in the Roman character, with a valuable index, illustrative of the present state of the philological investigation of the Zend language.

Dr. Wilson also stated that an opportunity having offered itself of directly forwarding a complete copy of the Society's Journal to the Society of German Orientalists, it had been embraced. The Society approved of what had been done in this matter, as it regularly receives the Zeitschrift of the German Society on its publication, and directed its own Journal to be regularly forwarded in exchange in future.

The Secretary stated, with reference to the subscription list for reprinting the "three volumes of the Transactions of the Literary Society of Bombay," that 77 copies had been subscribed for, and requested that the reprint might now be ordered in octavo, &c. &c. as proposed by the Hon'ble J. P. Willoughby, Esq., at the Society's Meeting held on the 20th March last.

With reference to the letter from Government, No. 3261 of 1851, forwarding a number of lithographed copies of Captain Taylor's letter, bearing date 27th February last, on the remains of Cairns, Cromlechs, and Kistvaens, in the Shorapoor Districts, and the desirableness of ascertaining if similar remains were to be found in other parts of this Presidency, it was resolved that copies should be handed over to the Cave-temple Committee, for distribution in such a manner as would render Captain Taylor's object most likely to be attained.

Dr. Bradley's paper (p. 140) on Rock-cut Caves of Aurungabad was also handed over to the Cave-temple Committee, for their forthcoming report.—*14th August* 1851.

The Hon'ble the President, seconded by Captain French, proposed the following resolution, viz:—"That as no division took place on Mr. Malet's motion, which was carried at the last Meeting, there is no evidence on the Minutes to show that it was decided by two-thirds of the Members then present, and therefore the resolution adopting the motion is void under Art. XVIII. of the Society's Regulations."

The Revd. Dr. Wilson, Honorary President, seconded by Captain Forbes, then moved as an amendment:—"That it is competent to this Meeting to declare that the majority in favor of Mr. Malet's motion, which was carried at the last Meeting, consisted of two-thirds of the Members then present."

The amendment was submitted, and lost by a small minority, and the original motion carried by the casting vote of the President, six having voted for, and six against it.

The Hon'ble the President, seconded by Captain Forbes, intimated his intention to move at the next Meeting,—"That it be referred to a Select Committee to consider whether any change can be made without injury to the Society in reducing the Annual Subscription, in order to make it more accessible to scholars, and to promote the further investigation of Oriental Arts and Sciences."

It was also proposed by the Hon'ble the President, seconded by the Revd. Dr. Wilson, "That a Special Committee, composed of the Revd. Dr. Stevenson, Captain French, H. Conybeare, Esq., and the Secretary, be appointed, to report on the present state of the Society's Museum, and the arrangements that might be made for extending its utility." Agreed to.

Proposed by the Revd. Dr. Wilson, seconded by Dr. Don,—"That Dr. Leith, Professor Harkness, and the Secretary, be appointed to receive the books ordered for the Malcolmson Testimonial, and to carry into effect the remaining part of the Society's resolution respecting them." Agreed to.

The letter from Dr. Buist having been read, forwarding copy of one dated 10th March 1851, from M. F. Maury, Esq., intimating that a box had been sent to Smith, Elder and Co., containing, among other things, the following presents to the Bombay Asiatic Society from the National Observatory at Washington, viz.—1 vol. Astronomical Observations, and a complete set of Charts, as far as published, the Secretary was requested to acknowledge the intimation, with the Society's best thanks, and to present a complete set of the Society's Journal in return to the National Observatory of Washington, taking advantage of Dr. Buist's kind offer to forward the parcel free of charge.

The letter from Captain Eckford, submitting a plan for the illustration of the monuments of antiquity in Western India, in accordance with the views of the Hon'ble the Court of Directors, was handed over for the consideration of the Cave-temple Committee.

Dr. Wilson, referring to a letter addressed to him by Assistant

Surgeon F. Broughton, dated Kolapore, the 25th ultimo, mentioned that several ancient excavations and temples had lately been discovered by that gentleman, which would be duly brought to notice in the next Memoir of the Cave Commission.—11*th September* 1851.

Dr. Wilson read an extract of a letter to his address from Professor Westergaard, of Copenhagen, dated the 21st July last, thanking the Society for its subscription to his critical edition of the Zend writings; intimating his publication of an edition of the Pehlivi Bundehesh, and his presentation to the Society of a copy; and expressing his opinion, founded on a critical examination of the so-called Pehlivi writings, that they are not in any Sasanian language, but merely in a dialect (probably the Kirmanian) of the modern Persian, disguised by the use of an imperfect alphabet, often now mis-read by the Parsís, the Shemitic words introduced into it being merely corrupted Arabic. Dr. Wilson, after illustrating Mr. Westergaard's theory of the Pehlivi by a few examples, expressed his entire concurrence in it, and stated that it accorded with suspicions which he had now for some time entertained.

The Government letter No. 3837, forwarding a copy of one from H. B. E. Frere, Esq., to the Government, with a communication respecting the remains of Cromlechs, Cairns, Barrows, &c. in Scinde, by Captain Preedy, Collector of Kurrachee, was handed over to the Cave-temple Committee.

In accordance with the request of the Society at last Meeting, the Committee then appointed to look into the state of the Museum, &c. had assembled, but had not been able to procure all the estimates necessary to accompany their report, of which that part alone was complete which had reference to alterations necessary to protect the present specimens from being destroyed by the dust. This having been read, the Society sanctioned the disbursement necessary to defray the expense of these alterations.

Captain French's motion respecting the printing of a list of the works annually purchased by the Society, recorded in the Minutes of the Meeting before last, was unanimously carried.

The Hon'ble the President's motion, proposed at the last Meeting, respecting the reduction of the annual Subscription, was also carried, with the exception of the words "the Committee" being substituted for "a Select Committee," 14 having voted for, and 4 against this amendment.

A. Malet, Esq., C. S., then moved the following Resolutions:—

1st. "That at a Meeting of the Society the perusal by the Secretary of the Proceedings of the previous Meeting is solely for the purpose of verifying the correctness of the Secretary's record." This was unanimously carried.

2nd. "That it is not competent to a Meeting to decide on the validity of the Proceedings of a former Meeting, in the absence of the notice of intended discussion required by Art. XVIII. of the Rules."

To this Dr. Stevenson, Vice-President, seconded by Captain French, moved as an amendment—"That this question be referred for the opinion of the Committee of Management." The amendment was carried, 12 having voted for and 4 against it.

3rd. "That the Resolution of the last Meeting, by which, without the notice of discussion required by Art. XVIII. of the Rules, a Resolution of the previous Meeting was annulled, be rescinded."

To this also Dr. Stevenson, seconded by Captain French, proposed the foregoing amendment.

The Revd. Dr. Wilson then moved, "That in addition the Committee be further requested to ascertain and report upon the facts connected with the voting for the resolution referred to in the latter part of Mr. Malet's third motion." This was submitted to the Meeting, and lost, 6 having voted for, and 9 against it.

Dr. Stevenson's amendment in its original state was then put and carried unanimously.—*9th October* 1851.

Government letter No. 4049 of 1851, forwarding a copy of further communications from the Commissioner of Scinde, descriptive of certain ancient remains in that province, was handed over to the Cave-temple Commission.

With reference to Government letter No. 4004, offering to place the returns of the last Census at the disposal of the Society, the Secretary was requested to acknowledge the same with the Society's best thanks, and to state that they will be very acceptable; for, although not deemed trustworthy, as stated by the Government, they might prove useful in pointing out the practical difficulties with which Captain Baynes had to contend, and which led to their incorrectness, and thereby perhaps suggest some more effectual method of taking the Census of Bombay on a future occasion.

The report of the Committee of Management was read, respecting the possibility of reducing the Society's Subscription, &c. without injury to

the Society. The Committee had gone deeply into the subject, and considered that it was impossible. There would be a great annual deficit with the reduced Subscription, which must be supplied by reduction in the establishment, and in the purchase of books, or by the addition of many more new Members to the Society than could be anticipated; at the same time the Committee considered that the resources of the Library and Museum might, under proper restrictions, be placed freely and gratuitously at the service of persons engaged in literary or scientific pursuits, and that it might be as well to increase the powers of Members in this respect, and to allow the Committee to give access to anything under their charge.

The rest of the Report, which is lengthy, and accompanied by financial calculations, was received.

Captain French, seconded by the Revd. Dr. Stevenson, then proposed for discussion at the next Monthly Meeting :—

"That the Subscription is not intended to exclude learned students, natives of Bombay, who find it inconvenient to pay the full Subscription, from joining the Society as resident Members, and that it be referred to the Committee to devise some feasible scheme for that end."

Dunjeebhoy Framjee, Esq., Member, having laid before the Society for its approval a specimen of a Zend Dictionary in the English language, read the following Prospectus concerning it :—

"I have the pleasure to lay before the Society a specimen of a Zend Dictionary in the English language, which I have been engaged in preparing for several years, and I hope you will approve of it; and I beg leave to request the Members of the Society to suggest to me any improvement that may occur to them in regard to the execution of the work.

"It is intended to supply a desideratum greatly felt by the Parsís both of India and their mother country, Persia, for more than two thousand years, and to some extent by the Continental Orientalists.

"I have undertaken to publish the work in the English language as well as in the Guzerati, at the request of a few of my learned European friends, who are willing to promote the general interests of Oriental literature.

"A specimen of this work in the Guzerati language was kindly first inspected by our learned Honorary President, the Revd. Dr. Wilson, by direction of the Bombay Government, and I am indebted to him for expressing his desire that I should make an English version of the work, a suggestion which I considered it right to adopt.

"This work will be published in the two languages in two separate volumes, viz., volume 1st in English, and volume 2nd in Guzerati, with the original Zend words, with their respective transcriptions, and significations, and parts of speech.

"In this work upwards of a thousand notes will be interspersed, with philological and etymological explanations, for the purpose of a comparison of my humble opinion with those of the Parsí Priests and Continental Orientalists.

"For specimens of these notes I beg to refer you to the papers now laid before you.

"At the commencement of this work is a comparative table of the Zend Alphabet with those of the Persian, Pehlivi, Hebrew, Cuneiform Sanskrit, Guzerati, Greek, and Roman languages, in which their articulation is pointed out in their respective classes.

"Plate second contains a comparison of the Zend Orthography, according to the different systems of sixteen Asiatic and European Orientalists.

"Part 1st. Preliminary Discourse on the origin and authenticity of the Zend language and Zend Avesta.

"Part 2nd. Observations and Dissertations on the Zend Orthography.

"Part 3rd. Rudiments of the Zend Grammar.

"Part 4th. Table of the Zend Alphabets, according to the different Ravayats, and other manuscripts, &c.

"Part 5th. General remarks on the manuscripts and printed works of the Zend Avesta, &c. &c.

"Part 6th. The Pehlivi Alphabets, published with observations on the Lapidary, Cursive, and Numismatic, according to the different forms of their alphabets, to assist Pehlivian Scholars to decipher any of the Pehlivi writings of Tablets, Manuscripts, and Coins."

A letter was read from Dr. Crawford, descriptive of a large meteor which he had seen from the deck of the Steam-frigate "Zenobia," on the 7th September last, at 8 P. M., in Lat. 12° N. and Long. 46° 11′ 30″ E. It first appeared 40° above the horizon, bearing E. and S., and then pursued a horizontal course northward, vanishing at a point bearing NE. by E.—*13th November* 1851.

ANNIVERSARY MEETING.

MONDAY, 24TH NOVEMBER 1851.

THE Minutes of the last Meeting having been read and confirmed, the following Gentlemen were elected for the Committee of Management, Museum Committee, and Auditors for the ensuing year, viz :—

Committee of Management.

S. S. Dickinson, Esq.	Professor J. Patton, M.A.
Henry Young, Esq.	A. H. Leith, Esq.
Lieut. Col. J. Holland.	Revd. P. Anderson, M.A.
William Howard, Esq.	Professor Harkness, M.A.
J. Smith, Esq.	J. Don, Esq., M.D.

Museum Committee.

A. H. Leith, Esq.	Professor J. Harkness, M.A.
J. Smith, Esq.	Professor J. Patton, M.A.
H. Conybeare, Esq.	H. J. Carter, Esq.

Auditors.

A. Spens, Esq.	Captain J. G. Forbes.

Election of Vice-President.

Arthur Malet, Esq., Chief Secretary to Government, proposed by the Revd. Dr. Wilson, Honorary President, seconded by P. W. LeGeyt, Esq., Vice-President, was chosen to fill the vacancy among the Vice-Presidents, vacated by the late Colonel G. R. Jervis, of the Bombay Engineers.

The Motion of Mr. Malet, recorded in the Minutes of the Society's Monthly Meeting held on the 14th August last, was put as amended in the following form, seconded by the Revd. Dr. Wilson, viz :—

"That the Committee be requested to take into their consideration the expediency or otherwise of the formation of a class of Associate Members, who may enjoy its literary fellowship, and a restricted use of the Library, at a reduced rate of subscription, but without any interference with the Management of the Society by its constituent Members." This was unanimously carried.

A list of the works ordered for the "MALCOLMSON TESTIMONIAL" was laid before the Meeting. They are to be lettered on the backs

"BOMBAY ASIATIC SOCIETY," and "MALCOLMSON TESTIMONIAL," and stamped inside with the same, and will be placed in an appropriate part of the Library, headed also "MALCOLMSON TESTIMONIAL."

The following have been received :—

WORKS ON GENERAL NATURAL HISTORY.

	Vols.
NATURALISTS' LIBRARY. Edited by Sir W. Jardine, Bart.	40
DICTIONNAIRE UNIVERSEL D'HISTOIRE NATURELLE, with Atlas. 8vo. Edited by C. D'Orbigny.	16
ANNALES DES SCIENCES NATURELLES. 1re Série. 8vo..	30
——— Table Générale Alphabetique de	1
——— 2me Série, Tomes 40 in 20. ..	20
——— 3me Série, Tomes 26 in 14, up to 1850...	14

WORKS ON BOTANY.

Filices.

HOOKER, (W. J.,) and GREVILLE, (R. K.,) Icones Filicum. Folio ..	2

Algæ.

AGARDH, (C. A.,) Icones Algarum Europœarum. 8vo.	1
HASSALL, (A. H.,) History of the Fresh Water Algæ, &c. 8vo... ..	2

WORKS ON ZOOLOGY.

Zoophyta.

LAMOUROUX, (J. V. F.,) Histoire des Polypiers Coralligènes Flexibles. 8vo.	1
LAMOUROUX, (J.,) Exposition Méthodique des Genres de l'Ordre des Polypiers. 4to.	1
ELLIS, (J.,) Natural History of many Curious and Uncommon Zoophytes. 4to.	1
ELLIS, (J.,) Natural History of the Corallines, and other Marine Productions. 4to...	1

Acalepha.

LESSON, (R. P.,) Histoire Naturelle des Zoophytes Acalèphes. 8vo. ..	1

Entozoa.

BLANCHARD, (M.,) Les Intestinaux (Le Règne Animal, distribué d'après son Organization, par Cuvier, Ed. par une réunion, &c.) 8vo. ..	1

Infusoria.

DUJARDIN, (M. F.,) Histoire Naturelle des Zoophytes Infusoires, with Atlas. 8vo...	2

Crustacea.

EDWARDS, (M.,) Les Crustacés (Le Règne, &c. &c.), with Atlas. 8vo. ..	2

Insecta.

	Vols.
Fabricii, (J. C.,) Entomologia Systamatica, with Supplement. 8vo. ..	6
Fabricii, (J. C.,) Mantissa Insectorum. 8vo.	2
Donovan, (E.,) Natural History of the Insects of India. New Ed. by Westwood. 4to.	2
Drury, (D.,) Illustrations of Exotic Entomology. 4to.	3
Horsfield, (T.,) Descriptive Catalogue of the Insects in the Museum of the East India Company. Parts 1 & 2. 4to.	1
Pfeiffer, (L.,) Monographia Heliciorum Viventium. 8vo.	2

Mollusca.

Nyst, (P. H.,) Description des Coquilles et des Polypiers Fossiles des Terrains Tertiares de la Belgique, with Atlas. 4to.	2
Agassiz, (L.,) Monographie des Coquilles Tertiares réputés identiques avec les Espèces Vivantes. 4to.	1

Cephalopoda.

Ferussac et D'Orbigny, (A.,) Histoire Naturelle Générale et Particulière des Céphalopodes Acétabulifères, Vivantes et Fossiles, with Atlas. Folio.	2

Pisces.

Cuvier, (Le Baron,) et Valenciennes, (M. A.,) Histoire Naturelle des Poissons. 8vo.	22

Reptilia.

Dumeril et Bibron, Erpétologie Générale, ou Histoire Naturelle complète des Reptiles..	7

Aves.

Gray, (G. R.,) The Genera of Birds. Folio.	3
Latham, (J.,) A General History of Birds, with Index. 4to. 10 vols. in 6..	6

The Secretary having represented that more cases were required in the Society's Museum for the preservation of Specimens which are now lying exposed and loose about the Museum, as well as for the reception of others which might hereafter be presented, it was unanimously resolved that cases, of a similar construction to those in the centre, be placed round the walls of the Museum, for the purpose mentioned.

JOURNAL

OF THE

BOMBAY BRANCH

OF THE

ROYAL ASIATIC SOCIETY.

JULY, 1852.

ART. I.—*Geology of the Island of Bombay; with a Map and Plates.* By H. J. CARTER, Esquire, Assistant Surgeon, Bombay Establishment.

Presented December 1850.

DIFFICULT as it may appear to unravel the geological history of a tract of country which has been overflowed and ploughed up by successive volcanic effusions, and subsequently elevated, depressed, immersed, or denuded, or all four put together, yet, by patient investigation and search, such a knowledge of its structure and composition may be obtained, as to enable the observer to bring back, in his imagination, to their original state and position, the materials of which it was originally composed, and to place before the reader a satisfactory account of the changes which it has undergone during a given geological period,—changes which to him would otherwise be incomprehensible.

The little island of Bombay, just peeping above the waters of a muddy estuary, would seem to offer little or no novelty in this respect, particularly when compared with the great mountainous masses which surround it; but, when observed carefully, it will be found that what it lacks in size is compensated by amount of excavation, and that the latter has in all probability disclosed the geological type of the whole neighbourhood in its limited space.

Was the island of Bombay, as at first sight appears, composed of one mass of the same kind of dark-looking trappean rock, its geology might be told almost in as many words; but when it is found to present in its thickness the strata of an ancient lake, or river; a coal-deposit in miniature, filled with the fossillized debris of animal and vegetable remains, some, if not most, belonging to species now wholly extinct; and that there have been three or four successive effusions of volcanic matter over and into these strata, forming ten times as many different rocks, it naturally suggests the questions—How far did this lake extend? Was it a lake, or a river, or an estuary? On what kind of rock were its strata deposited? Of what material are its strata composed? To what extent does its coal deposit extend? What was its geological age? When was it destroyed and filled up? What rock first covered it? What kind of rocks subsequently forced their way into it? Has the island undergone any elevation or depression, and have any other strata been deposited on it since the period of active volcanic action ceased? Does the nature of its volcanic effusions, or their relative positions, bear any analogy to similar effusions in the adjoining islands, and on the main land itself?—are all questions which make the little island of Bombay assume a geological importance as interesting as at first it appeared to be unpromising. Let us now see if any of them can be answered.

From the following facts and observations, it will be evident that there have been three distinct periods in the formation of the island of Bombay, viz: 1st, the deposit of the fresh-water strata; 2ntl, the volcanic effusions; and, 3rd, the deposit of the marine strata.

Of the Fresh-water Formation, which was of course the oldest, we are unable to come to any conclusions beyond the following, viz., that by the absence of marine fossils in it, and the presence of fresh-water ones, it was deposited in a lake or river; that its upper part is seen entire for 36 feet below the igneous rock which overlies it; and that below this again its strata have been intruded and broken up by other igneous rocks; so that, at present, we can neither tell its whole thickness, nor the nature of the rock on which it was deposited. As to its limits horizontally, it can only be at present stated that it extended all over the island of Bombay, and that portions of it may be seen in the volcanic breccia at Ghora Bunder, a little village on the northern extremity of the island of Salsette, thus giving it an extent north and south of at least twenty miles. We shall see also, by the presence of organic remains in this formation, that it must have been the depository of a large quantity of wood, leaves, fruits, &c., and that these are generally in a fragmental state, and jumbled together, as if they had been brought

from a distance; also that plants, having conical bulbous roots, with stems formed of concentric layers, as if made up of sheathing leaves, like large bulrushes, grew in this lake; that it swarmed with the little entomostraco-crustacean animals called Cypridæ, and that an abundance of small frogs and marsh-tortoises were also present. Moreover, that the material of which its strata are composed seems from its color and composition to be of volcanic origin, but deposited for the most part in a subtle state, though occasionally granular and coarse-grained, but never gravelly, and always argillaceous. This, from the thin layers of which the formation is composed, must have been deposited very gently, and would therefore come nearer to the sediments of a lake than those of a swift stream. At what geological period these strata were formed is not yet known, because there have been no fossils yet found in them which can determine this; but a time arrived when the volcanic material of which they are presumed to have been formed was no longer transported through the agency of water, but came in a molten fluid, and, filling up the lake, dried up or turned off its waters, and changed the then sub-lacustrine plain of Bombay into one of dry black igneous rock. This brings us to the second epoch. It is most probable that this lake was above the level of the sea at the time this occurred, although the general level of its strata is now below it. One other fact connected with the fresh-water formation is here worth mentioning, viz. that within three inches of the igneous rock which overlies it, there is a stratum three inches in thickness, almost entirely composed of the casts of Cypridæ,—not of their valves singly, which they are wont to shed annually, but their entire casts, showing that some sudden alteration of the water in which they were living took place, by which they all as suddenly perished and fell to the bottom. After this occurrence no organic remains are seen, and nothing but the three inches mentioned of a kind of transitionary material between the fresh-water formation and the basalt. The amount of coal in this formation will be seen to be very trifling, and that nearly the whole of the wood and other vegetable remains have been replaced by argillaceous material. At the same time, it will also be seen that it is only at one place that the highly carboniferous part has been exposed, and that, too, over an area only of a few square yards, viz. in the cutting of the sluices, where the main drain of the island empties itself into the sea.

2ND PERIOD.—This period commences with the effusion of the basalto-dioritic tract which caps the main ridges in Bombay, and which, it may be presumed, was at first continuous all over the island. How far this tract of lava extended it is not our present object to inquire; it is

enough for us to know that it extended over the then plain of Bombay: originally it was probably much thicker than it is at present, but the weathering of ages has of course much reduced it, though even now it may be seen to measure 90 feet thick on the eastern, and 51 or more on the western side of the island. Immediately after this effusion, we may conceive the site of Bombay to have been part of a black arid plain: how long this continued geologically we have no proofs to show, but after it had become hard, probably, and fixed, there was a second effusion, which, coming up under the first, and not finding a ready outlet, followed the course of the fresh-water strata below it, intercallating them, and breaking them up into all-sized fragments. This effusion was for the most part scoriaceous or cellular, and gave rise to the amygdaloidal structure which is now its chief characteristic; though in Nowrojee Hill quarry it is compact, which might have arisen from the superincumbent weight of diorite over it at this part. The amygdaloid rock is found invading the fresh-water strata in every part of the island, in one form or another, non-cellular or cellular; the cavities in the latter instance being filled with laumonite, green-earth, quartz, or calc-spar, according to the locality. The part which this effusion took in raising up the longitudinal ridges in the plain of the first effusion, and which ridges, running about N. by E. and S. by W., now border the eastern and western sides of the island, there is no evidence to show; but that this, or the third effusion, to which we now come, or both, were active agents in this matter, there seems to be no reason to doubt, for we find those parts of the ridges most elevated where these effusions are thickest, and in the western ridge either one or the other is seen filling up the internal angle of the roof-like elevation formed by the fresh-water strata there. We have, then, a basalto-dioritic effusion, and an amygdaloid effusion; and now we arrive at another effusion, which we shall term the volcanic breccia. How long an interval elapsed between the amygdaloidal effusion and that which gave rise to the volcanic breccia is as inconceivable as the duration of the interval which existed between the first and second effusions, there being nothing in the island of Bombay to give the slightest idea of either; but, that the volcanic breccia was formed subsequently to the amygdaloid, is proved by the presence of fragments of the latter among the fragments of the other rocks which form the heterogeneous compound of the former. The principal characters of this effusion are that it is composed chiefly of angular fragments of the fresh-water formation, varying in size from particles which are invisible to the naked eye to pieces some tons in weight; also that it contains fragments of various sizes of the two

foregoing effusions; and, lastly, that it is of great extent, forming a continuous tract from Carnac Bunder all long the eastern shore of the island to Sion, and there composing the plain and chain of hills which form the north-eastern part of the island; also, still further, the principal part of the mountains in the island of Salsette. It is this effusion which I think contemporaneous with the Laterite, and in some parts identical with it in every respect; but this will be better understood by a reference to the latter part of the detailed description of this effusion,—we are chiefly concerned with it here as an agent in the changes of form which the first plain of volcanic rock has undergone; and no one can witness the cropping out of this breccia all along the base of the highest parts of the eastern ridge, and its free effusion at the north-east part of the island, with wells extending into it 60 feet deep in Mazagon, and veins and dykes of it bursting through the basalto-dioritic tract in the same neighbourhood, without feeling satisfied, that to make room for such an immense mass, the crusts of the previous rocks must have given way, and have been forced ridge-like upwards, as we now see them, to give vent to the volcanic torrent, which, breaking through the fresh-water formation and igneous rocks that opposed its progress, finally spread their fragments in the manner we have seen them along the eastern shore of the island.

The protean forms assumed by this effusion and its decompositions, passing through so many different rocks, may easily be conceived; it is therefore white at one part, blue at another, yellow at a third, brown at a fourth, red at a fifth, and black at a sixth, with all the intermediate shades; composed, as before stated, of fragments of rocks in the immediate vicinity, changed into all kinds of consistences, and more than that indeed, fragments of large-grained diorite, which have come up from a region much below any we are acquainted with in Bombay. As to structure and hardness, it presents every stage, from the coarsest and softest argillaceous breccia, which may be cut with a knife, to the blackest and hardest homogeneous jasper, seen at the hills of Antop and Sewree. Such a destructive agent, then, as this effusion must have been, might be safely allowed to have been the one most active in the upheaval of the longitudinal ridges in the island of Bombay, if not the mountains in the island of Salsette also. Lastly, we have a fourth effusion, and this is proved by the existence of dykes of volcanic breccia through the last mentioned. Of their contents, little can be made out, and they prove nothing further, than that the third was not the last effusion. In the detailed descriptions of the three latter effusions, I may have mentioned some little tracts as pertaining to one which

may pertain to another; but it is almost impossible to expect accuracy in this respect with effusions which are all more or less alike, and errors of such kind, after all, are of little importance, as they cannot affect the grand facts, and, moreover, the observer may correct them as he best likes himself. That there have been four successive effusions there can be no doubt; and that the three latter, pursuing a course in the first instance under the basalto-dioritic tract, have all contributed to destroy its horizontality, by raising up the ridges which now exist upon it, is equally obvious. With the dykes, which have been last mentioned, the period of active volcanic action in the island of Bombay seems to have ended; how far passively the island has since been affected there is nothing to determine.

3RD PERIOD.—*Deposition of the Marine Formation.*—There is nothing in this to make us think that it is of very ancient date geologically: it would seem to belong to the Post and Newer Pliocene Formations. The clay and lower part of the beach, as no remains of human bones or artificial structures have I think been found in either, perhaps belong to the former, while the shells consist of the same species as those which are found on the shore at the present time. That the island has undergone elevation since the period of volcanic action ceased would seem to be proved by the remains of a portion of sea-beach called Phipps' Oart, in the centre of the island, near which no sea now comes; but this elevation must be very trifling, for the ridge of a beach is always higher than the sea, even at the highest tides, and the summit of this is only eight or nine feet above high-water mark, while the accumulation of detritus poured into the estuary of Bombay from the neighbouring hills is as likely to have produced this, and to have filled up the lagoonal depression in the centre of the island to the level of the sea, as anything else.

At the same time, Bombay could never have been very deep, or long under water, or the deposits on it would have been much thicker than they are, and of more ancient date: as it is, the beaches hardly exceed 20, and the clay 10 feet in thickness. Where there is no clay, as close to the shore, the beaches are thickest, and *vice versâ*.

The analogy which the basalto-dioritic tract and amygdaloid effusions bear to those on the main land are most striking, and may be seen by a reference to Colonel Sykes' valuable paper on the Trappean Region of the Dekkan and Konkan, immediately opposite,*—that of the adjoining islands I hope at some future period to show myself.

* Trans. Geol. Soc., 4to, second series, vol. iv. p. 403.

Such is a short summary of the geology of the island of Bombay, and I have premised instead of appended it, in hopes that the reader may be induced to peruse the following descriptions in detail from which these inferences have been deduced; let us begin with a brief outline of its geography.

The island of Bombay is trapezoidal in figure, having its long axis nearly N. by E., and S. by W., its short parallel side towards the sea, and its long one towards the land. The outer side is six miles long, and the inner one eleven miles; both are bordered by ridges of hills, scarped towards the east, while they slope gradually towards the west. Between these ridges, which are about two miles apart, there is a level plain, called the "Flats." The greatest width of the island is a little more than three miles.

At the two short sides of the figure there are sandy beaches, which, being above the level of the "Flats," prevent the sea from overflowing them, but on the outer side of the island there is no beach, because the whole is black basalt, probably extending a long distance into the sea; while on the inner side, which borders the harbour, there is an accumulation of silt, deposited from the back-waters, and the rivers which empty themselves into the estuary, in which the island of Bombay is situated.

The southern extremity of the outer side of the island is called Malabar Point, and the northern Worlee; while the southern extremity of the inner side is marked by the Light House, which stands on the extreme end of a thin prolongation called Colaba; and at the northern extremity is a tower called Riva Fort. Between Malabar Hill and the extremity of Colaba is a deep bay, called Back Bay, in which there is a sandy beach, and on the opposite or corresponding side of the trapezoid is a similar excavation, in which there is also a beach, called Mahim Sands. Both of these beaches are a few feet above high-water mark, and they chiefly prevent the sea from overflowing the centre of the island.

The highest point in the lateral ridges (which are interrupted more or less by breaks here and there) does not exceed 180 feet, which is the height of Malabar Hill just above the eastern corner of Back Bay. The southern part of the eastern ridge, called Nowrojee Hill, is 117 feet; Mazagon Hill, next to it, 162 feet; Chinchpoogly Hill, 153 feet; Parell Flag-staff or Colongee Hill 163 feet, above high-water mark; and Antop Hill, which is in the centre of the little range bordering the north-eastern part of the island, is 85 feet; while another hill in the

same range, a little to the north of it, is about 127 feet above high-water mark,—the latter has been measured by comparison.

The Flats are but just above the level of the sea, which overflows a small portion of them at the "springs," and the ridges of the beaches average about six feet above high-water mark.

From this description, it must be evident that a section of the island of Bombay, either longitudinally or transversely, if proportionally given, will have a very insignificant appearance. (See Map.)

With respect to its relations with the main land, Bombay is separated to the northward from the mountainous island of Salsette, which is six or seven times larger, by a channel, narrowing to a point not more than 125 yards wide; while Salsette, again, in like manner, is separated from the main land by a similar channel. To the south and east of Bombay is its harbour, in which are also several mountainous islands and islets, which lie scattered between it and the main land. The harbour, or estuary, is about six miles across in its widest part.

This short geographical introduction will be sufficient to explain the map of the island of Bombay hereto annexed; let us now proceed to its geology.

Insignificant as the elevation of Bombay is from its low hills and general flatness, yet it is by no means so in geological composition, for although its structure is not known for more than 60 feet here and there below high-water mark, which, added to its highest point, gives only a total thickness of 240 feet, yet in this thickness we have from 30 to 50 feet or more of fresh-water strata, covered by volcanic rock, which has been thrown out over them, in some parts 90 feet thick, and pierced by various subsequent effusions even still thicker; together with a marine formation, filling up the lagoonal depression of the island, and consisting of mud, in some parts 10 feet, and in other parts sandy beaches, 20 feet thick. Thus we have abundance in a geological point of view to occupy our attention, although we have little geographically.

But, before proceeding further, it would be as well to consider the general composition of the ridges of the island, and then their mineralogical characters in detail, in order that we may arrive at a right understanding of the relative position of the rocks which compose them, and the names by which we intend to designate their various forms.

The rocks of Bombay, which chiefly form its ridges, come under the class volcanic, and all belong to the trappean system: there are no hypogene rocks, that is igneous rocks which have been formed below the surface, and afterwards raised above it. Besides these, there

is a series of aqueous strata, which comes under the head of fresh-water formations, from the character of its fossils; and this, as before stated, is overlaid, and intruded by, both the volcanic rocks.

The whole of the upper part of the eastern ridge, from Riva Fort to the end of Colaba, is composed of fine-grained diorite, more or less basaltic towards the summit, while the whole of the upper part of the outer or western ridge is composed of fine compact black basalt. Both of these rocks rest conformably on the fresh-water formation, which is composed of argillaceous and bitumenous shale, broken up by subsequent volcanic effusions, assuming the forms of trappite, aphanite, spilite, amygdaloid, &c.

Such is a brief outline of the general composition of the ridges, and the relative position of the rocks which compose them; the following are the mineralogical characters of the latter. I should here premise, also, that in nomenclature I shall chiefly follow Alexandre Brongniart's classification and mineral characters of rocks, as given under the article "*Roches,*" in the Dictionnaire des Sciences Naturelles.

Diorite, (syn. greenstone,) is essentially composed of felspar and hornblende, and is either coarse-grained or fine-grained—the former is generally the oldest: that of Bombay is fine-grained, and hardly admits of being recognized by the naked eye; but, when magnified, the dark green hornblende is easily distinguished from the less colored felspar. It is this compound which forms the upper part of the eastern ridge, and varies in color from green and blue to sometimes black. When it is very compact, sparkling, and sub-granular, its binary compound and crystallization almost undistinguishable, and its homogeneity almost complete, then we shall call it *basalt;* and in this state, possessed of a blue black, or deep purple color, it forms the upper part of the western ridge. Diorite, when forming part of a trappean effusion, may pass into basalt; hence we have the upper part of the eastern ridge in some places very basaltic. When the binary compound of diorite has an intermixture of blue earthy matter, it becomes a semi-crystalline rock, and this we shall call *trappite;* while, when there is no longer any appearance of the crystalline compound, viz. felspar and hornblende, and the whole is an earthy substance, it is called *aphanite,* from ἀφανίζω, to make unseen, in allusion to the felspar. I shall not make use of the term "trap" as a specific appellation here, as it confuses, and trappite and aphanite will, I think, be found sufficient. In this way, then, the distinguishable binary compound of diorite may pass into the undistin-

guishable one called basalt,* or into the semi-crystalline one, trappite, or earthy one, termed aphanite, in which all traces of both the felspar and hornblende in a crystalline state have disappeared. Now, when aphanite is cellular, its cavities being filled with calc-spar in particular, chlorite, zeolites, quartz, amethyst, or calcedony, it is called *spilite*, and the other rocks, too, when cellular, and filled with such substances, are termed amygdaloid, or variolitic. Under the foregoing generic names, then, we have all the trappean rocks in Bombay included. We next come to the fresh-water formation, in which we have argillaceous shale, argillo-calcareous shale, and argillo-bituminous shale, with small quantities of coal; also chert and jasper, arising from the exposure of the argillaceous strata to great heat. Add to the foregoing a volcanic breccia, composed of fragments of the other formations, bound together by a base of aphanite, more or less fine, more or less coarse; harder or softer, and sometimes passing into a black jasper, as at Sewree, and Antop Hill. Lastly, we have the blue and brown clay of the Flats, containing the calcareous concretions called *kunkur;* and the consolidated sand and sea-shells of the beaches.

Having thus premised sufficient to prevent a misunderstanding in the terms which will be used, and the kind of rocks they designate, let us now trace the different formations mentioned throughout the island, beginning with the diorite, which is the most prevalent, the most prominent, and the most widely-spread of all.

Diorite.—This rock forms the summit of all the eastern ridges, except that bordering the north-east part of the island, and will be found to extend continuously from the extremity of Colaba to Riva Fort, that is the whole length of the island. It is interrupted by breaks or breaches here and there, and diminishes in height towards both extremities; but between the fort and the village of Nagaum, a distance of five miles, it presents points of variable heights, rising to 163 feet above the level of high-water mark. In some of the breaks it appears to be so expended that its continuity is hardly traceable, as at Nagaum, while in other places, as at Nowrojee Hill, where it has been quarried, it is 90 feet thick. Again, the width of this tract varies, so far as it is observed superficially: it forms the whole of Colaba, and the eastern part of the Esplanade and Fort, and, of course, it extends into the harbour on one side, and, obscured by the beach which forms the

* Some basalts may of course be composed of felspar and augite, and, when this is the case, the rock is called "dolerite."

Esplanade, appears in Back Bay again on the other; but at present it will only confuse us to trace it where it is concealed, and, therefore, we will confine our observations to where it is exposed. It forms also the eastern part of the Native Town, at the northern extremity of which is the quarry of Nowrojee Hill, where, as before stated, it is seen to be 90 feet thick; here, also, its superficial area is greatly expanded, and extends continuously across the island from Mazagon Hill due west to the Flats, a distance of one mile. This breadth is greater than at any other part, and is prolonged from Nowrojee Hill due north to the Mount, a distance of one mile and a quarter. At this part, also, it has been intersected and pierced in all directions by a subsequent effusion, which we shall come to hereafter. At the Mount, it narrows again, and spreads out on Chinchpoogly Hill, and thence is continued on over Colongee or Parell Flag-staff Hill to the village of Nagaum; here it sinks to within a few feet of the level of the Flats, and is continued on in the form of a few boulders for half a mile, and then, rising again a few feet more or less, ends at Riva Fort, the northern extremity of the island. The principal feature of this ridge is, that it is more or less scarped towards the east, while it slopes more or less suddenly towards the west; a feature which, however, it should be remembered, is common to every hill in Bombay, without exception. Its summits and sides are also covered with naked rocks and boulders, from the mode of desintegration of the diorite, which follows the veins with which it is intersected; hence they are in cuboidal or polyhedral masses, and, when more minutely divided, end in becoming spheroids, throwing off concentric crusts.

The mineralogical composition and structure of this rock varies. Generally, its crystalline structure may be distinguished with a good magnifying glass, but sometimes it becomes so minute, and compact, and tough, that it almost takes on the form of basalt; still we may infer its composition by seeking out its structure in larger-grained specimens. In these we shall find tabular crystals of white felspar; amorphous crystals of green hornblende; a small quantity of green or blue earth, ("green-earth,") with more or less olivine; also small particles of peroxide of iron, or, probably, titanitic iron, or rutile, from its rich brown red color in some parts; all of which are caught up by the magnetized needle in their natural state when the mass is pulverized,—this, of course, can only be seen by manipulation under a high magnifying power. The presence of the iron accounts for the decomposition of the rock into greenish blue, then yellow, and lastly red earth, these being the usual colors which iron assumes in passing from its protoxide to its peroxidized state.

Further, it may be observed of this rock, *en masse*, that the upper part is tougher and more difficult to break than the lower part, while the latter, on the contrary, is more cleavable. Cavities are sparsely scattered in it, which contain varieties of scolezite or needlestone, the latter name being derived from its spicular crystallization. In some parts it is blacker than in others, while frequently it presents a spotted appearance, on account of the black portions being circumscribed instead of generally spread throughout the rock. I am unable to explain the latter appearance, except that the hornblende is blacker in these places than in others, probably from the greater quantity of protoxide of iron which it contains; in other words, that the distribution of the iron throughout the rock has been unequal, or has become aggregated in some parts of it more than in others during its crystallization or *ab origine*. In the next ridge I am about to mention, this mottled state prevails very much, and on weathering, the dark portions remain, while the lighter parts wear away, giving the surface a botryodal appearance, in which the spheroids are about the size of bullets. This form seems to answer to that called "*orbicular diorite*" (Bt.)

The next ridge we have to trace, and which is composed of the same rock, is very low, scarcely rising at one or two points more than 50 feet above the sea. It lies on the east side of the latter, and commences close upon the sea opposite Mazagon Hill, from the base of which it is separated by subsequent effusions of volcanic matter. Its rocks, which appear just above the sea at its commencement at Mazagon, rise gradually to Tank Bunder, where there is a high mound of it, after which it sinks below the mud, and subsequently makes its appearance again at Kandlee Battery: there, as at Tank Bunder, it rises to about 50 feet above the sea, and again sinks gradually, as it pursues a direct line northwards to within a hundred yards of the base of Colongee or Parell Flag-staff Hill, where it ends; being separated the whole way from the first ridge by the subsequent effusion to which I have alluded. It does not differ in composition or structure from the diorite of the first ridge, except that its surface in many places weathers into the botryodal form mentioned, particularly a little south of Tank Bunder; this is its great peculiarity. It is very insignificant in height, when compared with the first ridge; but is, in like manner, tilted up and scarped towards the east.

Lastly, we have a third ridge of diorite on the east side of the island, which begins at a point 400 yards N. E. of Kandlee Battery, called Jackaryah's Bunder, and 600 yards east of the first ridge. It pursues a course a little to the eastward of north, and, about a mile from its

commencement, attains a height of 78 feet, after which it gradually gets lower, and finally joins the first ridge about two and a half miles south of Riva Fort, or about half a mile beyond Nagaum. In mineral composition, structure, and physical features, it corresponds with the first ridge, being scarped on the eastern, and sloping more or less suddenly on the western side.

In addition to the main ridge, then, there are two other short ridges of diorite on the eastern side of the island, and all these rest on the fresh-water formation, as we shall see; let us now go to the western side.

Basalt.—The western ridge, which extends from Malabar Point to Worlee Fort, is entirely of black, or blue-black basalt, interrupted by a break or two. Its height, as before stated, in one part, exceeds that of any other hill on the island, being 180 feet above high-water mark, just over the western corner of Back Bay. Like the eastern ridge, it is scarped on the eastern side, and slopes more or less suddenly on the western one, passing off afterwards with a very slight inclination into the sea. In its broadest part it is about 600 yards wide, that is the distance between the scarped side and the sea, and everywhere it appears stratified, the lines of stratification dipping suddenly, in the ridged portion, towards the west. In its scarped portion it presents a columnar arrangement, consisting of large cuboidal masses, arranged one above another; while its surface in some parts presents an hexagonal prismatic arrangement, to wit on the shore at Worlee, and in Back Bay. It is fragile almost to brittleness a little beneath the surface, but superficially, where it presents the hexagonal arrangement, is exceedingly tough. Throughout it is minutely divided by intersecting quartziferous veins, the structure of which, where exposed, is open and cellular, and of a rusty color, while the centre of the polyhedral masses which they surround is firm, black, and compact. Like the diorite of the eastern ridge, it decomposes into spheroids, throwing off concentric crusts; in some parts, however, beneath the surface, it appears to undergo an irregular jointed disintegration, the surface of the fragments presenting a greenish-blue colored argillaceous earth, which afterwards becomes brown, yellow, or red. There is a remarkable absence of cellular cavities in this rock,—I do not know that I ever saw a trace even of any except here and there, where there was a little olivine: its chief difference from the diorite of the eastern ridge lies in its black color, and in its compact structure and minute texture, which defies all attempts at analysis by optical examination; also in its apparent stratification and hexagonal prismatic arrangement on the surface in some places, and in its more rectangular disintegration. Like

the diorite, however, of the eastern ridges, it rests on the fresh-water strata, but is nowhere pierced, to my knowledge, by any subsequent effusion. Thus, with these little differences set apart, it so much resembles the diorite of the eastern ridges that one can hardly consider it otherwise than as a more compact part of one and the same formation, which was once continuous across the Flats, but has been since separated by fracture, upheaval, and denudation. To this effusion, therefore, we will give the name of Basalto-dioritic Tract.

Fresh-water Formation.—Next in succession below the basalto-dioritic tract comes a series of aqueous strata, which, by their fossils, are proved to have been deposited in fresh water. They consist of argillaceous shale, which, so far as it has been exposed, appears to have been formed from the fine detritus of volcanic matter, with which is mixed a quantity of organic remains, both vegetable and animal. In their upper part they are of a light brown color, passing gradually downwards into a greenish or blueish deposit, and then into black bituminous shale. In no part do they, to my knowledge, present any gravel or large detritus.

At their junction with the basalt, at the cut of the sluices at Lovegrove,—for we will, before tracing these strata over the island, study them at this part, where they are least disturbed, and best seen,—the basalt is decomposing for some distance up, and passing into spheroids, which become more and more divided, until they disappear altogether, and leave nothing but a few traces of their concentric crusts: at this point the basalt rests upon the aqueous strata, and presents a number of vertical tubes, filled with crystalline quartz. These tubes are about five or six inches long, about half an inch broad at the base, and taper towards the extremity: some rise immediately from the surface of the aqueous strata, others a little above it. They are either solid or hollow, and occasionally bifurcated below, and were probably air-cavities in their original state, perhaps produced by the evolution of gases from the vegetable matter over which the fluid basalt had spread itself. These tubes are best seen on the eastern side of Lovegrove Point, under the tomb of Mama Hajanee, near high-water mark; they exist also at the sluices, but I have not seen them anywhere else.

Lying immediately below this is the first stratum of the aqueous deposit, which is only three inches thick, and presents nothing, apparently, but the transitionary state of the volcanic into the aqueous formation. Next it, however, comes a remarkable layer, though not thicker than the foregoing, which is compact and siliceous: the peculiarity of this is that it is almost wholly composed of casts of the

shells of the little entomostraceous crustacean animals called cyprides, with which is mixed a variable quantity of vegetable remains, consisting of small short fragments of plants, without any particular shape. It also has another peculiarity, which is, that it is almost wholly composed of silex, in the form of amorphous or crystalline quartz, which has either wholly or partially filled the cavities of the shells, the forms of the shells themselves having disappeared. Hence we find this stratum in preference to all others chertified, jaspidified, or blackened and basaltified by heat; and thus we have in many places evidence of the existence of the upper part of the fresh-water strata, where the rest have had their stratification destroyed, or have had their structure almost wholly transformed into something else. This stratum is well seen at Lovegrove Point, and on the northern side of the break through which the sluices have been cut. It will be recognized by its whiteness, and its oolitic structure, immediately underlying the black basalt. At the northern side of the sluices it presents a remarkable fold upon itself, which, before it is understood, is very confusing, insomuch that it gives the appearance of two or three of these kinds of strata, instead of only one.

From this deposit downwards, for 36 feet, we have argillaceous shale, which was deposited generally in very thin layers of impalpable powder, but in some instances consisted of coarse grains, which from their blueish, greenish grey, and white colors, seem to be heterogeneous in composition, but are still all argillaceous. The color of these strata throughout would also appear originally to be greenish or blueish grey, which is deepest or blackest where there is most carbonaceous material, although in their upper part they are of a bright brown, or yellow fawn color, which tints on both sides diminish in intensity as the distance from the line of junction between the volcanic and fresh-water formations increases. Throughout these strata there is an abundance of fossilized vegetable remains; and towards their middle those of animals, to wit, tortoises, while at their lower part are found the skeletons of frogs. The vegetable remains consist chiefly of the fragments of plants, which at the upper part appear to have been small, but towards the lower part were much larger. In the upper part they have been nearly decarbonized, and replaced by siliceous or argillaceous material of a white, grey, brown, or bright yellow color, presenting under the microscope in many instances the polygonal or fusiform shapes of their original cellular structures, while towards the lower part they are black and carboniferous. Such as have been found entire, or possessing a recognizable form, will be described hereafter.

The next stage of these strata presents an interlamination of black

carbonaceous deposits; this occupies about a foot and a half, when it is followed by two and a half feet of shale, without black layers, imbedding a great number of globular and conical nodules, like septaria, which, on being fractured, generally exhibit the forms of bulbous roots or stems in their interior. These strata, which are the lowest of the undisturbed part of this portion, are harder and more compact in their structure than the foregoing.

We have now an intrusion of blueish or greenish grey colored volcanic matter, apparently composed of the ingredients of diorite, but all heterogeneously mixed up together, and in the form of argillo-siliceous material, imbedding large portions of carboniferous shale, and, from its napthous odour, impregnated throughout with the remains of vegetable matter. This extends down for twelve feet, or to the bottom of the cut of the sluices. It is, of course, unstratified, and presents a venous intersection, like volcanic rock. The upper six feet is of a lighter color than the shale immediately above it, and, although richly charged with small fragments of vegetable remains, contains little, when compared with the six feet below, which are full of large pieces of black argillo-bitumenous shale, bearing the remains of large flat long leaves, pieces of dycotyledonous wood, seeds, seed-pods, and various other fragments of the vegetable kingdom, all of a deep black color, and many sparkling and slightly coal-bearing, though chiefly composed or replaced by argillaceous material.

The coal, which occurs here and there in small granular deposits on the leaves, and about the argillized wood, burns with a bright flame, bubbles up, and leaves a shining black scoriaceous cinder, which lightens a little in color under the blow-pipe. Also portions of mineral resin, resembling "hatchetine" or mineral tallow, are occasionally met with; and invariably calc-spar in company with both these substances. The mineral resin is sub-granular, like bee's-wax, and breaks, but is too waxy to be pulverized; it floats in water, but sinks in alcohol; is translucent, of a weak pearly lustre, and of the colour of bee's-wax; feels greasy, and is inodorous; dissolves readily in turpentine, but not in ether or alcohol; becomes soft at a temperature just below 212° Fahr., but does not melt in boiling water; when exposed to a greater heat becomes very fluid, but does not take fire until the temperature is raised, when it burns away with a bright flame, leaving no residue. Besides vegetable remains, the little cyprides abound in all the masses of this shale; the elytra of insects have been found in it, and the remains of shells something like *Melania*, but all more or less blackened, argillized, and in a carboniferous state.

Plate VII.

Fig. 1

1A.

1b.

3.

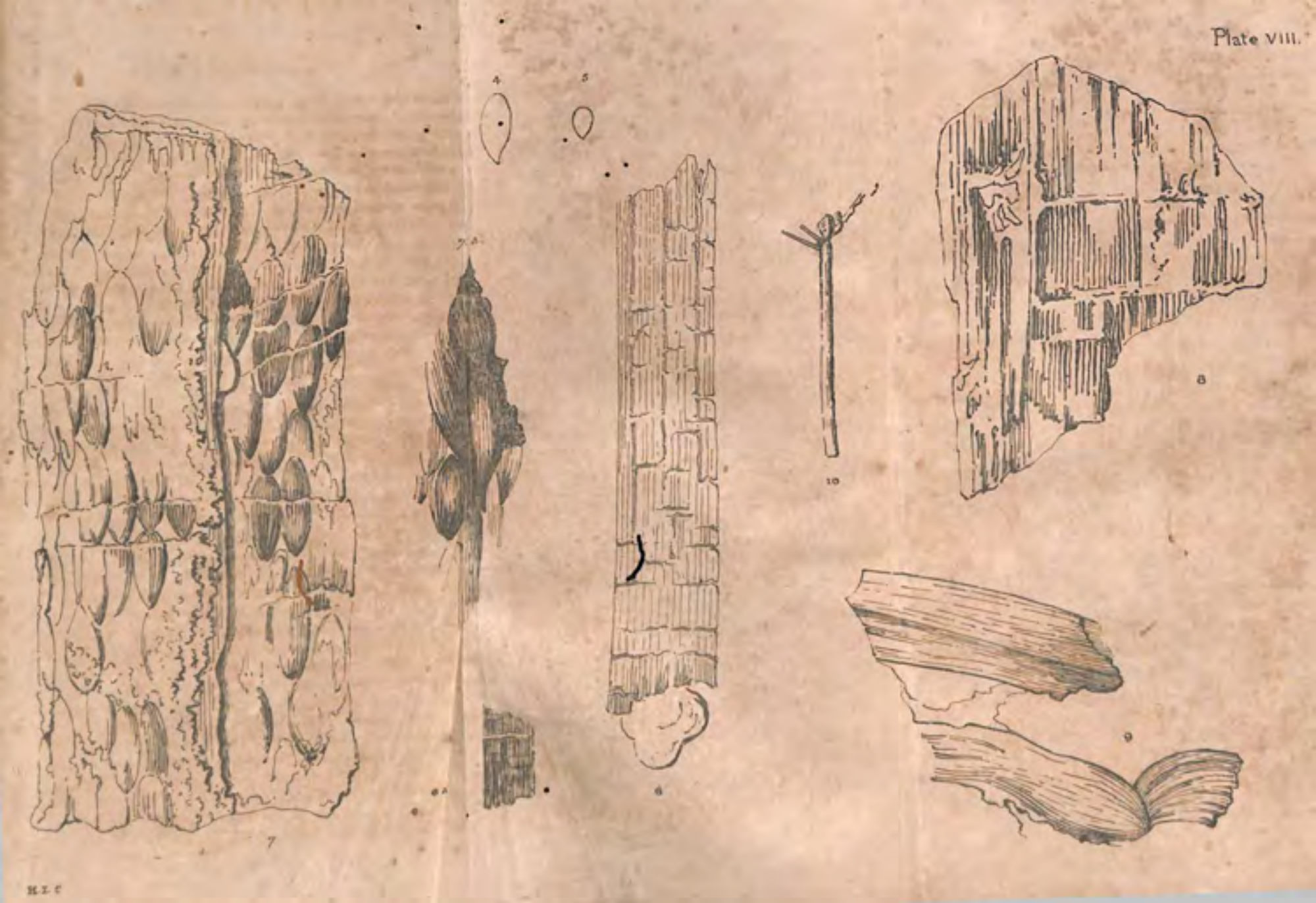
3A.

2

2

I.C.

Plate VIII.



In no other part of the island has this rich carboniferous portion of the fresh-water strata been observed beyond the depth of a foot or two, affording only a few thin layers of the uppermost argillo-bituminous deposits, viz. those in which the skeletons of the frogs are found. All, therefore, that we know of it, is from what has been exposed by the excavation of a few cubic feet at the cut of the sluices, where it has been broken up into fragments by the intrusion of the igneous rock. In no place has it yet been seen undisturbed, or resting on the formation on which it was deposited, and therefore no conception can be formed of its depth, or the rock on which it rests conformably.

Let us now turn our attention to a description of the fossils which have been found in this formation, beginning first with those of plants.

Roots.

Fig. 1, *a*, *b*, Plate vii., is bulbous, cormiform, ovoid, elongated; truncated above, pointed below; marked with transverse rows of short vertical parallel striæ, the rows extending more or less round the body, each row tapering towards its extremities, and ending in a point between that above and below it, in the manner of scaly imbrications. Striæ superficial, and sometimes continuous for some way longitudinally. Truncated end presenting concentric lines, like the petiolations of sheathing leaves; pointed end, where fractured, presenting a succession of coats, concentrically disposed. Length of specimen 5 inches; widest transver sdiameter 2¼ inches. *Loc.* black shale.

Obs.—These roots are almost lapidified, from the compactness of the argillaceous material by which they have been replaced. They are black externally, where the striæ present the only carboniferous part about them; and a little lighter colored within. The rows of striæ shine in the manner of vegetable impressions in clay generally, and the petiolations in the truncated end are marked by delicate white lines of calc-spar. A few cyprides are seen in the interior of these roots, which shows that they must have been widely cellular, or hollow.

Fig. 2, *a*, Pl. vii.—This specimen is of the same description as the foregoing, but appears more globose. The oblique direction of the striæ from above downwards and outwards would also seem to indicate this. Like the foregoing, the striæ are in little bundles, hardly elevated above the surface, and only prevented from being continuous longitudinally by their being raised at one end more than the other. *Loc.* lowest part of the undisturbed shale, and in the intruded igneous matter.

Obs.—These are found in great numbers in that part of the shale just mentioned, and appear very much like septaria. They are less black than the foregoing, thus according more with the color of the strata in which they are chiefly situated. When fractured, they develope a kind of stem or bulb internally, with its largest or rounded end downwards, that is following the position in which they are found; but the accumulation of adventitious material around them makes it almost impossible to arive at their original size or shape.

Stems.

Fig. 3, *a*, *b*, Pl. vii., is a section only. Length 1½ inches, and diameter 1$\frac{7}{7}$ inches. Sub-round, slightly striated longitudinally. Truncated end presenting circular lines indicative of the petiolations of sheathing leaves, with the external one of the latter broken off towards the bottom of the specimen, *Loc.* lowest part of the undisturbed shale.

Obs.—This, or rather these pieces of stems, for there are many of them, would appear to belong to the bulbous roots last mentioned. There is very little appearance of a more consolidated portion having existed at their circumference; and internally the presence of cyprides shows that they must have been widely cellular, like the so-called roots; also the lines of petiolations before mentioned, that they must have been formed of sheathing leaves.

Under this head also comes *fossil-wood*, of which there appears to be a considerable quantity and of various kinds, chiefly dycotyledonous. One specimen met with measured two feet long, and six inches broad: it appeared to be a segment of a small trunk; the bark is on it, and, from the infiltration of a lighter substance between this and the wood, and the latter being deficient towards the centre, the whole was probably undergoing decay when immersed. The grain of the latter is distinctly seen, but the soft argillaceous matter which has replaced it, as in most other specimens of the kind, does not admit of a sufficiently fine polish to examine it more minutely. The bark presents externally a number of small projections, and is guttered into large irregular lozenge-shaped divisions.

In one part of the bark was growing a fungus, or portion of adventitious wood, which, on falling out, brought away a part of the trunk-wood itself. It is of a compressed circular shape, about 1½ inches in diameter, and constricted at the base. Many of these kinds of bodies occur in this black carboniferous deposit, and will probably be found to have had the same origin.

No pieces of palm-wood have to my knowledge been found, with the

exception of one unsatisfactory specimen; but many small short fragments of wood which possessed a tubular structure, and present a segmental form, like pieces of the common bamboo. The latter occur here and there in almost every part of the fresh-water formation; above, where the vegetable remains are decarbonized, they are of a brown or grey color, and lower down, where they are carboniferous, of an intense black color. Besides these, the upper strata present innumerable fragments of small plants, many of which appear to be portions of the stems of grasses. They are all very nearly decarbonized, and replaced by siliceous or argillaceous material, of a white, grey, brown, or yellow color. Those which are grey present under the miscroscope a number of polygonal grains or crystals, like the polygonal cells of vegetable structures, while those which are brown and yellow often present the fusiform cellular structure. The crystals representing the former average $\frac{1}{271}$ inch in length, and $\frac{1}{60}$ inch in breadth; and the argillaceous bodies representing the latter $\frac{1}{43}$ inch in length, and $\frac{1}{2150}$ inch in breadth. Amongst the thousands of little fragments that I have seen towards the upper part of the strata, where they abound in layers, and seldom exceed an inch in length, I have not been able to discover, with the exception of a compressed stem and globular root of some wide grass or bulrush, and two small roundish leaves, which will be presently mentioned, one single fragment possessing a form that could be recognized.

Leaves.

Figs. 4, 5, Pl. viii., are the impressions of the two leaves last alluded to. The largest is oblong and oval, length $\frac{8}{12}$ inch, breadth $\frac{3}{12}$ inch. The smallest sub-round; length $\frac{4}{12}$ inch, breadth $\frac{5}{24}$ inch. *Loc.* upper part of brown shale.

Obs.—These leaves were found among the fragments just mentioned, where there were thousands of other portions, possessing the parenchymatous form of cellular structure mentioned, and, as before stated, without any recognizable form. They look more like leaflets of an accacia, perhaps, than anything else.

Fig. 6, Pl. viii., is the compressed remains just mentioned of part of a long narrow leaf or stem, cracked into fragments, with a tuberous root at the end. Length of specimen $4\frac{3}{4}$ inches, breadth $\frac{11}{12}$ inch; structure fibrous, parallel, longitudinal. *Loc.* brown shale.

Obs.—Three or four specimens of this stem or leaf were found together, but only one with the remains of the root. They are very common, and their cracked state, as well as the cracks which are seen

in the flat grey portions of the parenchymatous structure in these remains generally, seems to throw some light on the origin of the infinitude of small formless fragments which pervade these strata, viz. that while the plants from which they were derived were undergoing decomposition, either at the margin or the bottom of the fresh water in which they were deposited, these cracks took place, and, when there was no superincumbent material to keep them in their original position, they floated off, or were otherwise scattered about, and at length finally became stationary in the places where they are now found.

Fig. 7, Pl. viii.—This is a carbonized impression of a scaly leaf or stem in the black shale. It is very thin, and presents elliptical scales, which have their long axes longitudinally; also the transverse cracks to which I have just alluded. Specimen about 4½ inches broad, and 1 foot long. The scale, (Fig. 7, *a*,) or division, consists of an arched elliptical projection, $\frac{1}{4}\frac{7}{4}$ inch long, and $\frac{7}{10}$ inch broad. It is striated longitudinally, and seems to be surrounded with a very narrow flat rim or base, by which it is united to that of the adjoining scales. *Loc.* black argillo-carboniferous shale, in the intruded igneous rock.

Obs.—Only one specimen of this kind has been met with: it was discovered by Dr. Leith, and presents a thin layer of sparkling coal on its surface.

There are many other fragmental impressions of flat long leaves, both large and small, (Fig. 8, Pl. viii.,) with longitudinal striæ more or less perceptible on them, and more or less coal-bearing, in the black argillo-carboniferous shale or deposit; also impressions of large and small cordate leaves, and an imperfect impression (Fig. 9, Pl. viii.) of two lanceolate leaves, like those of the bamboo, except that they appear to be opposite instead of alternate. Dr. Leith, to whom I am indebted for most of these specimens, also sent me an impression (No. 10, Pl. viii.) closely resembling the stem and flower or seed of a cyperaceous plant, something like *scirpus lacustris*.

In no instance, to my knowledge, has the impression of any fern been discovered, though I thought at one time I had found the *sorus* of one, which afterwards fell off the specimen, and was thus lost. This was in a portion of the upper light brown-colored shale, from the tank north of the Horticultural Gardens.

Seeds and Seed-pods.

Fig. 11, Pl. ix., is a small flat capsule, circular, or horse shoe shaped, with a pedicle rising in the centre, and passing off by the incomplete

portion of the ring. It presents a single row of seeds, arranged round the circumference of the disk. Diameter $\frac{1}{10}$ inch. *Loc.* light brown shale.

Obs.—These little discoidal bodies, looking like the magnified ringed capsules of a fern, are not uncommon among the accumulated fragments of vegetable remains in the upper part of the fresh-water strata.

Fig. 12, Pl. ix.—This seed, like that of *Artabotrys odoratissimus*, presents the ruminated appearance of the albumen peculiar to the natural order Anonaceæ. Length $\frac{1}{7}\frac{1}{4}$ inch, and breadth $\frac{5}{7}\frac{5}{4}$ inch; compressed, elliptical, and slightly pointed at one end. The ruminated albumen is in transverse lines across the seed, and in radiating ones towards the circumference of the round end. *Loc.* upper brown shale.

Obs.—This specimen was found by Dr. Leith, who pointed out its analogy to the seed mentioned.

Fig. 13, Pl. ix., is a siliquose pod; length $3\frac{1}{4}$ inches, and breadth $\frac{5}{7}\frac{5}{4}$ inch. It is long, sub-round, slightly enlarged towards the apex, which is also round; narrowed towards the stem. *Loc.* black argillo-carbonaceous shale.

Obs.—Close to it lay two other apparently one-seeded pods, of the same description.

Fig. 14, Pl. ix., is another siliquose pod, broken off towards the stem. Length of specimen 3 inches, breadth $\frac{3}{4}$ inch. Long, lanceolate, narrowing a little backwards; angular laterally, presenting a ridge on each side, not opposite; slightly concave on each side the lateral ridge; flat along the sutures. *Loc.* black argillo-carbonaceous shale.

Obs.—For both of these specimens, as well as others of the same kind, I am indebted to Dr. Leith: a vertical section, parallel to the line of suture, has been made in one, but it fails to show anything definite in the interior.

There are a great number of large seed-like bodies throughout the whole of these strata, particularly in their lower part; but they are two undefined to admit of description.

No Gyrogonites have yet been met with.

Insecta.

Fig. 15, Pl. ix.—*Cypris semi-marginata.* (H. J. C.)—Length $\frac{22}{400}$ inch, breadth $\frac{14}{400}$ inch. Ovoid, sub-reniform, compressed laterally at the small end, dilated laterally at the large one; presenting a wide rim round the margin of the valves at the large end, which gives the cast an expanded appearance. This rim is obliquely striated externally, the striæ

passing from the convex or posterior border of the shell downwards and forwards. *Loc.* throughout the whole of the fresh-water strata.

Obs.—The obliquely striated rim round the large end of this fossil was pointed out to me by Dr. Leith; and since that I have observed that the prolongation of the valve in this direction is common to the few recent specimens I have yet met with in Bombay. It is likewise striated in them, but the striæ are short, and radiate from the circumference of the valve, instead of passing off obliquely from it, as in the present instance. Neither is the prolongation of the shell in this direction so wide, nor does it extend so much round the valve in the recent as in the fossil specimens. If we look into the interior of the valves of the former, (Figs. 18, 19, 20, Pl. ix.,) we shall see that the inner margin of the border is extended inwards more or less all round the valve, but more particularly at either end, and, of the two, most at the larger or posterior end, where there is left between it and the outer margin a thin lunate expansion. Beyond this comes a prolongation of, or appendix to the valve, in which there is a lunate fossa, or depression, separated from the general cavity of the shell; and this appears to be the portion which is so extensively developed in the fossil species under consideration, on the back or outer side of which are the oblique striæ mentioned. The segment enclosing the fossa or depression, however, in the recent species, instead of being one of a larger, is one of a smaller circle, while that of the fossil species is the contrary, the latter extending round the whole of the posterior or larger half of the shell, and expanding it dorso-ventrally. There does not appear to have been any papillæ on the surface of this fossil species, as is the case with most recent cyprides, but these may have been very minute, and may have disappeared during fossilization, or have been rendered imperceptible by the opacity of the object. I have named this species *Cypris semi-marginata*, from the character which I have just described.

Fig. 16, Pl. ix.—*Cypris cylindrica?* (Sow.)—Length $\frac{25}{400}$ inch; and breadth $\frac{11}{400}$ inch, sparsely papillated. *Loc.* lower part of undisturbed shale, among the frogs' bones.

Obs.—This appears to be *Cypris cylindrica*, which is also found in the chertified lacustrine deposits of the basaltic district of India. (See Malcolmson's Fossils of the Eastern Portion of the Great Basaltic District of India. Geol. Trans. 2nd Series, 4to, vol. iv. Pl. xlvii., fig. 2.) It is a little more than twice as long as it is broad.

Fig. 17, Pl. ix.—*Cypris* ———— ? Length $\frac{19}{400}$ inch, and breadth $\frac{12}{400}$ inch. *Loc.* upper part of fresh-water strata.

Obs.—Of this specimen I have never seen the shell, but an appearance in the mould, as if its surface had been closely and minutely papillated.' It is distinguished from the cast of *Cypris semi-marginata* by not having the impression of the rim mentioned, and is therefore not so expanded dorso-ventrally; nor is it so prominent transversely, towards the large end, as *Cypris semi-marginata*.

The three fossil cyprides above described swarm throughout the fresh-water formation. I have already stated that within three inches of the overlying basalt there is a stratum of their casts three inches thick, not of one valve only, but of the whole shell, and the probability that this was occasioned by some sudden alteration of the water in which they lived. When most abundant, their shells are found in thin layers, which, being frequently separated from each other, would seem to point out that they had been deposited in great numbers at particular periods. In the upper part of the strata they are always more or less mixed up with small remnants of vegetable matter, while lower down the fossil skeletons of frogs are sometimes found upon the flat surface of the black carbonaceous shale on which they have been deposited. They are also found abundantly throughout the woody deposits, and entire in the interior of the roots and stems mentioned; in short, as I have stated, they almost swarm throughout the whole of this formation.

They would appear to have their corresponding forms in the three most common cyprides now found in the fresh-water accumulations of Bombay to which I have just referred, but the latter are much larger, as will be seen by comparing their relative sizes in the drawings, all of which have been delineated upon the same scale. Fig. 18 is sub-globular, tetraedral; prominent laterally; flat ventrally; sub-pyramidal dorsally; covered with minute papillæ, supporting short spines or hairs. Length $\frac{30}{400}$ inch, breadth $\frac{22}{400}$ inch. Fig. 19 is elongated; cylindrical; slightly incurvated ventrally; sparsely covered with large, and thickly beset with minute papillæ. Length $\frac{36}{400}$ inch, breadth $\frac{15}{400}$ inch. In both these specimens the borders of the valves present a substriated or milled appearance, particularly over the prolonged portion of the posterior or large end. Fig. 20 is sub-reniform, and covered with large papillæ, almost touching each other. Length $\frac{26}{400}$ inch, breadth $\frac{14}{400}$ inch. This has also the prolongation of the valve posteriorly.

Fig. 21, Pl. ix., is the right wing of a small coleopterous insect, one of two specimens found by Dr. Leith. It is $\frac{1}{10}$ inch long, and

presents parallel longitudinal ridges, with rows of puncta along their course, and transverse wavy lines across the ridges. *Loc.* black shale.

Obs.—This fossil is carbonized, and under it was found a layer of calc-spar, apparently the remains of the transparent wing; beneath which again were the ridged impressions of the under part of the elytra.

Fig. 22, Pl. ix.—This is the remains of a shell like *Melania*, which was conical, elongated, composed of five whorls, the latter costated transversely. Length $\frac{1}{4}\frac{1}{4}$ inch, and breadth $\frac{5}{7}\frac{5}{4}$ inch; total length of the impression $\frac{1}{4}\frac{1}{4}$ inch; the additional length does not appear to have been caused by a part of the shell, though by something belonging to it. *Loc.* black shale.

Obs.—The specimens of this fossil are very indistinct, and formed of the same material as the black carboniferous shale in which they are imbedded. There are other impressions of a smaller shell of the same kind, but with a rounded apex, like that of *Pupa*: all were found by Dr. Leith.

In the chert of the upper strata, containing an abundance of cyprides, with fragments of plants, the section of a roundish shell, something like *Paludina*, was found.

Reptiles.

Rana pusilla.—This is the name which has been given by Professor Owen to the fossilized remains of the skeletons of the frogs to which I have had occasion to allude. The following is Professor Owen's description of them, which will be found in the Quart. Jl. Geol. Soc., vol. iii., p. 224, taken from specimens given to Mr. Clarke by Dr. Leith, who was the first person that discovered them:—

"The portions of shale transmitted by Mr. Clarke contain delicate, but for the most part distinct, traces of the generally entire skeleton of small anourous *Batrachia;* the osseous substance is black, as if charred.

"The number of vertebræ, atlas and sacrum inclusive, is nine; the caudal vertebræ are fused into a long, slender cylindrical style, as in most anourous *Batrachia.*

"In the specimen (Fig. 1) which lies on its back, the posterior convexity of the vertebral bodies is shown.

"The short, sub-cylindrical, and very slightly expanded lateral or transverse process of the sacrum, and the absence of ribs or their rudiments in the dorsal vertebræ, with the proportional expanse of the skull and length of the hind legs, show the specimens to belong to the family of Frogs *(Ranidæ).*

18

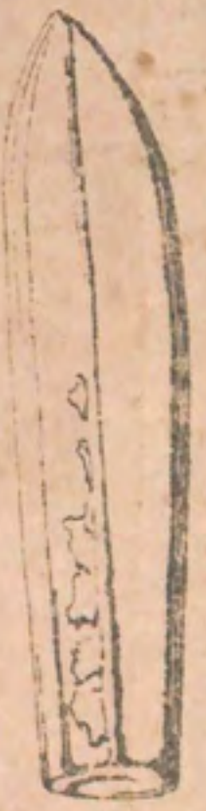
19

20

11

Nat. size.

13



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Nat. size.

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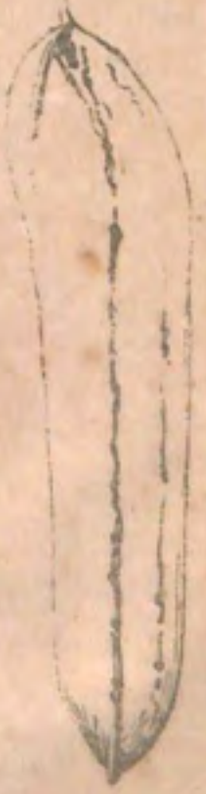

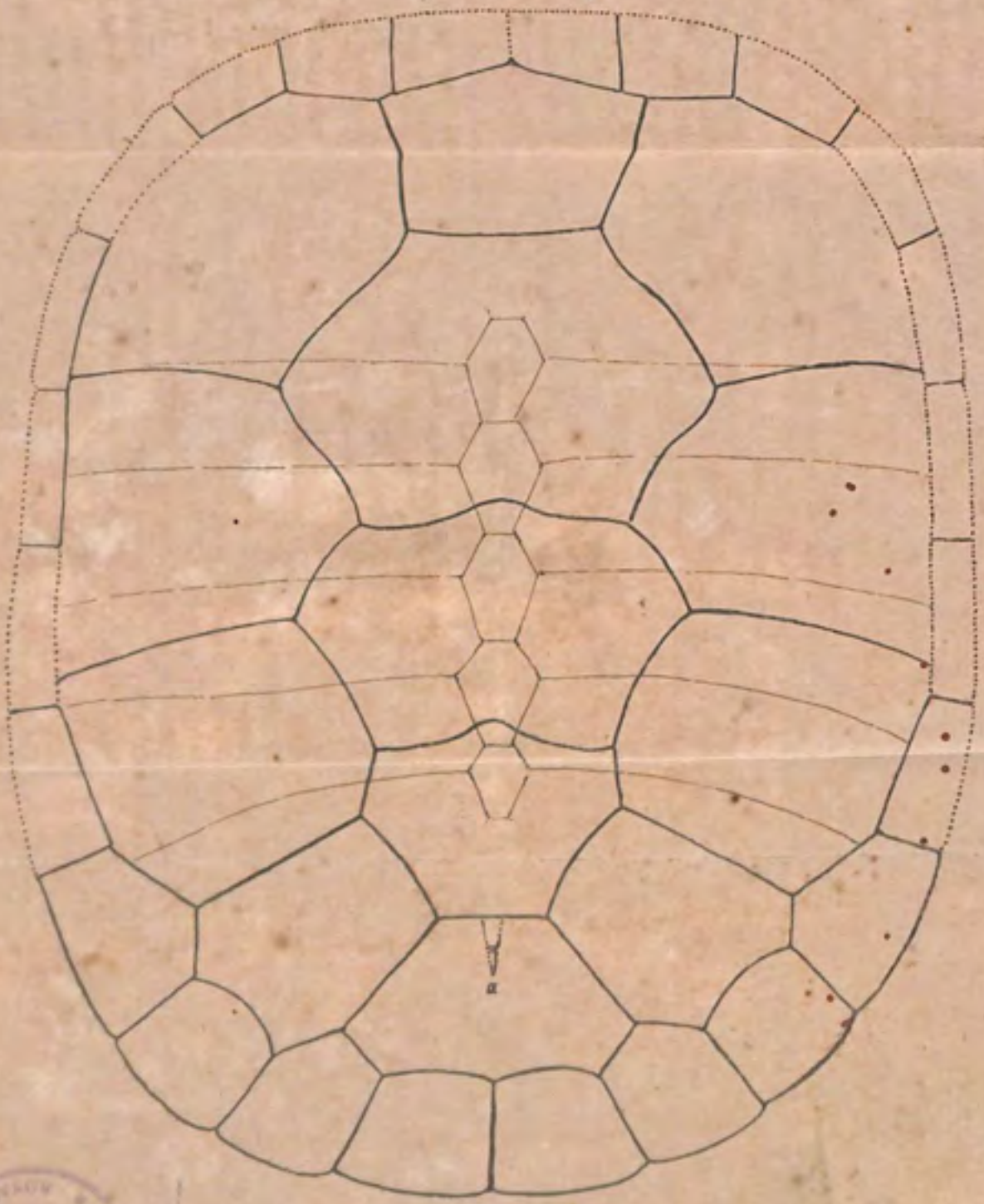

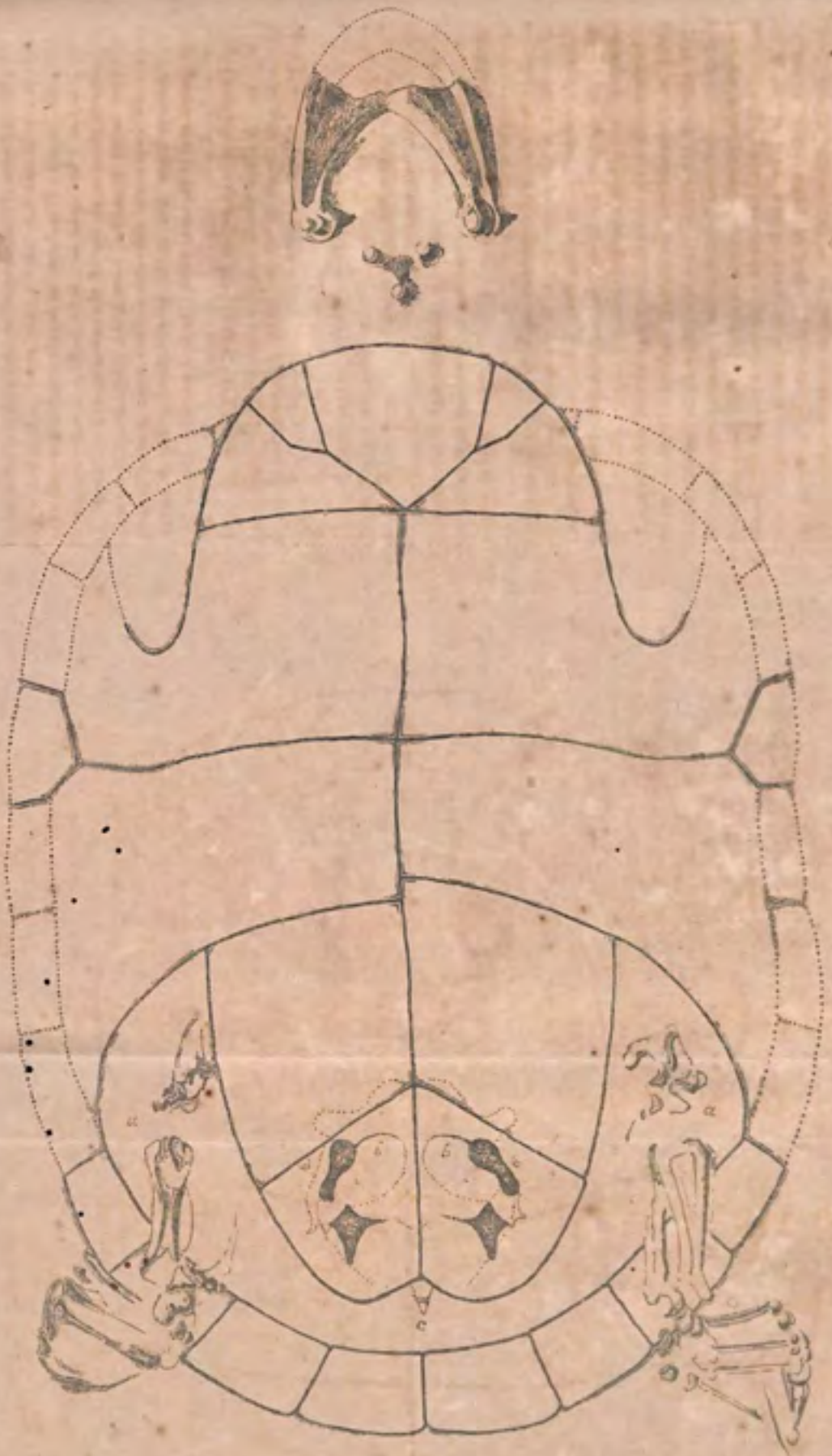

Testudo Leithii (n.s.c.)

"There are seven abdominal vertebræ, with long and sub-equal transverse processes, that of the second (third vertebræ including the atlas,) being the longest. The humerus is cylindrical, not expanded, as in *Cystignathus*. The head is a little larger relatively than in *Rana temporaria, Rana esculenta,* or *Hyla viridis;* and still larger therefore than in the Toads and Natterjacks, *(Bufonidæ,)* or than in the *Pipa;* the expansion of the sacrum removes the genus *Pipa* and the *Bombinatores* from that of the present fossils. The following are admeasurements of the more perfect specimens:—

	Inches.	Lines.
Length from front part of head to symphysis pubis.	0	6½
„ of the head	0	2¾
„ of the dorsal vertebral series	0	2¾
„ of os innominatum	0	2½
„ of femur	0	2¾
„ of anchylosed tibia and fibula	0	2¾
„ of tarsus	0	1¼
„ of whole foot	0	4½
„ of whole anterior limb	0	4

"All the specimens belong to individuals which had completed their metamorphosis, and they are similar to one another in size; they may have belonged either to a not quite full-grown brood, or to an unusually small species, of *Rana*.

"They conform in all respects as closely to the typical organization of the Frogs of the present day, as do the fossils discovered by Goldfuss in the tertiary lignites of the Siebengebirge, and referred by him to *Rana diluviana;* but the Bombay batracholites differ not only in their smaller size, but also in their proportionally larger skulls."

In most of these skeletons the teeth may be seen, and the bones are found (as Professor Owen has stated) in a charred state, in the black shale, which at the Sluices exists in separate layers, towards the lower part of the undisturbed portion of the fresh-water formation. They have not, however, yet been found *in situ;* but their position is inferred from the character of the shale in which they are imbedded. Generally the skeleton is entire, with the extremities more or less flexed, as they would be in a dead frog; and they lie flat on the black mud on which they have been deposited, alone, or amidst layers of cypridæ. They abound at the Sluices, and in black shale excavated from wells on Malabar Hill, three miles off; and appear to be confined to the part of the fresh-water deposits mentioned; but are there found in different layers. In one specimen of black shale, which is $\frac{1}{12}$ inch thick, and

composed of six layers, they appear on every layer; in another specimen, belonging to Dr. Leith, they are on layers an inch apart, a deposit of brown shale half an inch broad intervening between the black carboniferous layers; and, in one instance, in and around a disturbed and broken up portion of black shale, I have met with their bones scattered with *cypris cylindrica*, in the heterogeneous-looking argillaceous deposit, probably of igneous origin, intercallating and surrounding that shale; while in the unbroken part of the shale itself the skeletons are entire, and the disposition of the bones the same as that in parts where they have been undisturbed. That the enveloping material here is of igneous origin is proved by its bluish or greenish-grey color, its heterogeneous-looking appearance, its argillaceous nature, its massive and unstratified form, and effervescence with acids. Hence it seems probable that in breaking up the black shale it swept off the loose bones of the skeletons, and carried them into the positions mentioned. Had it been otherwise, viz. that the igneous matter had flowed into the fresh water, and killed these animals, then there would have been no broken up black shale present, with the undisturbed skeletons entire in it; for the former would have overflowed the latter, and not have intercallated it. But this will be better understood when we come to consider the igneous effusion which has intruded these strata.

Testudo Leithii. (H. J. C.)—(Plates x. and xi.)—The remains of nine specimens of this tortoise have been found by Dr. Leith, and the following description has been taken from them:—

Carapace. (Pl. x.)—The 1st dorsal plate is pentagonal, almost quadrilateral, with two irregular sides in front, meeting at an extremely open angle, and behind a border slightly concave anteriorly; its lateral boundaries are rectilinear and divergent. 2nd dorsal plate about twice the size of the first; hexagonal; half as broad again transversely as it is antero-posteriorly; posterior border suddenly convex forwards in the centre, and longer than the anterior border; lateral borders undulous, and meeting at an obtuse angle outwardly. 3rd dorsal plate one-tenth less than the second; hexagonal; nearly twice as broad transversely as it is antero-posteriorly; posterior border abruptly convex forwards in the centre; much less in length than the anterior border; anterior lateral sides convex outwards; posterior lateral sides convex inwards, both meeting at an obtuse angle laterally. 4th dorsal plate a little more than half the size of the third; hexagonal; contracted posteriorly; posterior border straight; antero-lateral sides also straight, and short; postero-lateral convex outwards, both meeting

in an obtuse angle. 5th, or last dorsal plate, heptagonal, triangular, with the apex truncated; contracted in front; presenting posteriorly four sides, which unite with the two supra-caudal, and half the two first femoro-marginal scales; lateral sides rectilinear.

Antero-costal plate tetragonal, sub-triangular. 2nd costal pentagonal, its two inner sides forming an obtuse angle upwards. 3rd costal quadrilateral. The last pair of the costal ranges are broader above than below, and present six sides, by the three smaller of which they articulate with the marginal plates which correspond to them.

Marginal scales 24. Marginal collar and first brachials sub-quadrilateral, longer than broad; second brachial pair trapezoidal; supra-caudal sub-square, trapezoid; first and third margino-femoral pairs pentagonal, the latter longer than broad; the intervening ones square; fifth margino-lateral oblong, broader behind than in front. Of the other margino-lateral scales there are no specimens.

Plastron. (Pl. xi.)—Plane, elliptical; round anteriorly, and notched in the centre posteriorly, but not deeply; intergular plate four times larger than the gular, and pentagonal, sub-triangular, the two posterior sides meeting at an obtuse angle; gular plates resemble isosceles triangles, with their posterior edges a little bent outwards, towards the apex. These three anterior plates are locked in between the brachials, which resemble scalene triangles; they are not so large as the intergular plate. The portions of the pectorals and abdominals which cover the sternum present square figures. The femorals are quadrilateral, having their internal lateral border less than their external lateral one, which is slightly convex on the outer side. The anal plates are triangular and rounded exteriorly, and cover that part of the sternum to which the pelvis is soldered. (See plate.)

Where the axillary and inguinal scales might have existed the parts are imperfect, but there do not appear to have been any.

The head appears to have been triangular and flattened, unless this arises partly from pressure, and the nostrils obtuse; there is a deep gutter extending from the muzzle backwards, becoming superficial as it approaches the superior occipital bone. The orbits themselves are directed upwards.

The pelvis is soldered in front to the sternum, and the tail appears to have been so short that it only just extended beyond the ilia. Fortunately the point of it remains in one specimen in that position.

Dimensions.—Length of carapace 7¼ inches, breadth in its flattened state 6 inches. Length of plastron 7 inches; breadth at inguinal angles about 2⅞ inches, and breadth in the centre about 4⅝ inches.

Head.—From the nasal extremity of the anterior frontals to the basilar bone 1 $\frac{9}{10}$ inch; distance between the posterior angles of the orbits $\frac{1}{11}$ inch; distance between the anterior angles of the orbits $\frac{1}{12}$ inch; distance between the posterior angle of the orbits and the extremity of the mastoid process, which is prolonged blackwards, 1 $\frac{1}{10}$ inch; width between the condyles of lower jaw 1$\frac{1}{2}$ inch. *Loc.* The remains of these tortoises were found in the shale excavated from the undisturbed part of the fresh-water formation at the Sluices. Dr. Leith, however, is under the impression that one of the specimens came from a pit in the eastern side of the Flats just opposite. They have not been found *in situ*, but appear to have come from the middle of the undisturbed strata.

Obs.—Thus, it will be seen, from the pelvis being soldered to the plastron, that this tortoise belonged to the *pleuroderal elodians* of Dumeril and Bibron, none of which are now found in Asia; and from the absence of the nuchal plate, that it belonged to one of their first five genera. Also from the form of its scales generally, as well as the shortness of the tail, that it came nearest to the genus called *Sternotherus*, and of the species of this genus nearest, in the form of its scales, to *S. castaneus*. (Dumeril et Bibron Erpétologie Générale, vol. ii. p. 401.) It differs, however, from the latter species in the anterior lines of the pectoral scales of the plastron being parallel with those of the abdominal scales, instead of meeting at an angle backwards. In size it agrees exactly with the length of the carapace of *Sternotherus niger*; the plastron is also very nearly as large as the carapace. In the specimen from which the drawing has been chiefly taken, the plastron has been probably pushed forwards out of its original position, by the pressure to which these parts have been subjected during fossilization: in all the specimens both carapace and plastron are in contact. The horny parts of both, marked externally with their intricate network of grooves, as well as the outer layers of the bones themselves, are all charred, while the cancellous structure of the internal parts, being filled with calc-spar, presents its original appearance. Above are described all the parts of this tortoise which admit of it: the remains of nine individuals, as before stated, have been found, all very nearly of the same size, and all by Dr. Leith, after whom I have named it, and to whose rare attainments and acute perception we are indebted, not only for bringing to light the existence of the remains of this animal in the fresh-water strata of Bombay, but for almost every other valuable specimen that has been obtained from them, thus claiming, in fact, the merit of having first directed the attention of the public to this interesting formation,

Having described the upper strata of the fresh-water formation where they are best seen, and a few of the fossils which have been found in them, let us now trace them throughout the other parts of the island. I have already stated that they are overlain by the basalto-dioritic tract, and that this tract in the first instance was probably continuous all over the island, but that it has since been broken up into the ridges already described, and much of the parts which intervened carried away by denudation. Hence, it may be conceived, that the same agent which threw up these ridges also threw up at the same time more or less of the fresh-water strata which lay beneath them, and that therefore the latter will be found to be exposed on the scarped sides of, as well as in the plains between, these ridges, where the basalto-dioritic tract has been uplifted or removed. That such are the facts will presently become evident.

Beginning with the ridge on the outer side of the island, called Malabar Hill, we naturally look, in its scarped or eastern side, for the strata in question, and there we find them overlaid by the basalt, which in some parts is 50 feet thick; while they are completely hid on the other, or western side, where the basalt, which at first slopes suddenly over them, afterwards, as before stated, extends outwards into the sea at a very small angle of inclination. If we commence, then, from Malabar Point, which has been stated to be the southern extremity of the outer ridge of the island, we shall perceive these strata on its eastern side appearing just above the water's edge about 50 yards in: they are easily distinguished by their light brown or fawn color, which contrasts strongly with the black basalt above them. Following them northwards, we find that they gradually increase in thickness as the ridge rises; but after two-thirds of a mile suddenly become contorted and twisted into all kinds of shapes, indicating that at this part, which extends for about 300 yards, they have undergone more disturbance than at any other, and a short search shows us that it has been caused by the intrusion of an igneous rock. It was from the contents of a well excavated at this spot that the specimen of black shale and igneous matter, containing the bones of the frogs in a scattered state, was obtained. After this disturbed portion, the strata again resume their parallelism, and may be traced along the whole of the eastern side of Malabar Hill to Mahaluximee, where there is a break in the ridge of 1000 yards, extending from the place last mentioned to Lovegrove Point or Mama Hajanee, from whence the ridge is again continued on to the Sluices, where there is a second break, about 250 yards wide, and where the cut of the Sluices, which extends from the Flats to the sea,

exposes the section from which the foregoing description of this formation has been chiefly taken; and from which the principal part of the fossils mentioned have been derived. From this break on to Worlee Fort, or the northern extremity of the outer ridge, the fresh-water strata may be again traced, cropping out from the scarped portion of the basalt, and at the latter place may again be seen to be intruded by igneous matter.

Throughout the whole of this ridge they present an anticlinal elevation, one side of which dips more or less to the west, the other to the east, becoming almost horizontal again at the base of the ridge, where they extend, concealed under the basalt, into the sea on one side, and, exposed, over the Flats on the other. At the Sluices the dip of most of the strata on the west side of the anticlinal axis is more than 45°, and on the east side would appear to be the same, but is obscured by the Sluices; while the intruded igneous matter is seen filling up the angle of the arch thus formed, as if it had been the disturbing agent.

We now come to the Flats, and here the fresh-water strata are not continuous any more than the basalto-dioritic tract, both having, apparently, been broken up together, and suffered a like denudation: it is only here and there that a portion of the fresh-water strata is seen entire, being for the most part mixed up with intruded igneous matter, or entirely transformed by decomposition; but, on passing across the Flats, we again find them here and there, overlaid by the diorite, and hence we may expect to find them exposed again in the scarp of the eastern ridge in a similar manner to that we have seen on the western ridge, for, tracing them where they are yet entire on the eastern side of the Flats, viz. at the end of the Grant Road, we find them 600 yards further due east, viz. in Baboola Tank, underlying the diorite, as before stated; and again, 650 yards still further, in the scarp of the quarry on the eastern side of Nowrojee Hill, but here in a thin line, either on account of the intruded igneous rock having merely separated a foot or two of the upper part of this formation from the rest, or from the pressure of the incumbent basalto-dioritic tract, which is here very thick. In Baboola Tank these strata, which are only five feet thick, are seen to have only four feet of diorite left above them, while in Nowrojee's quarry they have 90 feet. Again, after tracing this formation across the Flats opposite Parell to the eastern side of Parell Tank, we find its strata appearing in the wells there, also, with only a few feet of diorite above them; and, if we cross over the hill, we shall find them cropping out again on its eastern side. Thus they are seen to pass across the Flats, and to appear again on the scarped side of the eastern ridge,

proving that they have been everywhere superposed by the basalto-diuritic tract.

Let us now go to the scarp of the eastern ridge, and follow these strata northwards, from Nowrojee's quarry, where, as before stated, they are reduced to a thin line. For some distance after this the state of the hills, from being covered more or less with grass, does not permit of our seeing them satisfactorily, but when we come to the southern extremity of Chinchpoogly Hill, the thin stratum, composed of the casts of cyprides, with fragments of plants, which I have before stated to mark the upper boundary of this deposit, is again recognized, immediately underlying the diorite, and not more than 30 feet above high-water mark. This stratum, in a broken, black, basaltified state, may thence be traced for 900 yards, rising all the way, until it is elevated by a subsequent igneous effusion to the crest of the hill itself. From this, we may trace these strata on to Parell Flag-staff Hill, and thence to a tank beyond the Gardens, where they exist in very thin layers, making in all 16 feet thick; wavy from disturbance, and dipping, as usual, greatly towards the west. They are here richly charged with fragments of plants, and the casts of cyprides, but do not present a single black carboniferous lamina; although immediately on the other side of the ridge opposite Parell Tank there are portions of interlaminating black bituminous shale which have been excavated from the wells there, just like those which are obtained from the wells at Malabar Hill and the Sluices, in which the frog-skeletons are found.

From the former tank the fresh-water strata are continued northwards through a valley, over an area of upwards of a mile long, and from two to three hundred yards broad, uncovered by the diorite, as in the Flats, and forming a horizontal plain between the first and third eastern ridges, already described, until they reach the village of Nagaum, on the road to Sion, where they join the strata on the Flats, and the main ridge of diorite is for a certain distance reduced almost to a few boulders.

This formation may again be seen in the valley between Kandlee Battery and Jackaryah's Bunder, that is between the second and third eastern ridges, passing up to the tank at north of the Gardens, and in its way exposed in a large excavation to the depth of 16 feet, dipping, as usual, towards the west. Lastly, this formation may be seen again on the eastern side of the third ridge, extending northwards from Jackaryah's Bunder, more or less broken up, to Sion, at the northern end of the island.

From what has been stated, then, two facts are now evident, viz., that there is a fresh-water formation, and that it is partly overlaid by a

basalto-diorite tract, which was once continuous, and probably horizontal. After this, a third fact becomes evident, viz. that there must have been some subsequent cause to throw up these two formations, at first parallel to each other, into their present ridges. The consideration of this cause brings us to the description of the intruded igneous matter, or second effusion.

Second Effusion.—I have already alluded to the presence of igneous rock among the contorted strata, a short distance in from Malabar Point; that it is seen again at the cut of the Sluices, and again at Worlee, the northern extremity of this ridge; also in different parts of the Flats, &c. But as yet I have designated this effusion by no particular name; and when we remember that it has flown in between the aqueous strata, breaking them up into fragments, bruising them into powder, and more or less amalgamating with them, we cannot wonder that in one place this effusion should have assumed one form and in another another, depending upon the quantity of foreign material with which it has become mixed. Hence it will be necessary to go to that place, or places, where it is most pure, first, and ascertain its original character. For this purpose, let us begin with it at Nowrojee Hill, where it is 40 feet thick, and apparently as pure as when it first came from the volcano. Here it underlies the thin line of fresh-water strata mentioned, and in the form of trappite; differing so little from the diorite above, that until we compare the two together, the points of difference do not appear. When, however, this is done, we observe in the trappite that there is a great addition of blue argillaceous earth to the binary compound of felspar and hornblende of the diorite; also that the former is of a darker blue color, more earthy in structure, and more soft and yielding to the hammer; the color and breaking of this rock alone will enable the experienced observer while in the quarry to say directly from what part it came, still to the ordinary observer the two are one and the same. This is the state of this effusion, I presume, where it is seen intercallating the aqueous strata below Dr. Buist's house, or nearly opposite Sewree, but the part exposed there is decomposing into spheroids, and too far advanced to satisfactorily exhibit by fracture its original state. In Baboola Tank, and at the tank north of the Horticultural Gardens, it is an amygdaloid aphanite, with a greenish colored base, the cavities being filled with laumonite, which is surrounded by green-earth, and which substance in many places seems to become a pseudomorph of laumonite. On the Chinchpoogly part of the eastern ridge, just behind the house called Lowjee Castle, where there has been an outburst of a still later effusion, the cavities of the former, which

is decomposed where it remains on the upper side of the latter, are partially or wholly filled with quartz crystals; large crystals of hyalin and amethystine quartz from crushed geodes are also seen in it; while on the lower side of the dyke the cavities of the amygdaloid are filled with green-earth in a fresh green, and decomposing brown, rock. They are also filled with quartz in the neighbourhood of Sindu Para; in an area of about half a mile square, on the western side of Ghorpadevi, towards the Flats, where the rock is brown colored; and, further north again, with green-earth, that is to say in the neighbourhood of the house called Lowjee Castle. On the eastern part of the Flats, nearly opposite Parell, the cells are filled with calc-spar, and for several feet down the rock is a brown spilite, (base aphanite, filled with crystals of calc-spar,) imbedding pieces of the aqueous strata towards the surface, which become less downwards, and the rock, becoming blue, at length passes into trappite. In some parts this rock is veined with calc-spar, and in others presents geodes or large cavities, filled with large lenticular crystals of the same, resting on their edges. Still further north, again, at Dharavee, this effusion is of a light yellow or fawn color, and is commonly called "White Trap." There is a large tract of it here, and in many parts, where it is amgydaloidal, the cavities are filled with a soft fine white clay, like white green-earth, which seems to be an ultimate pseudomorph of laumonite here. In the museum of the Asiatic Society there is a radiated mass of scolezite, passing into a fine flesh-colored greasy pseudomorph, very like pagodite; and also several massive varieties, which have lost their crystalline appearance, and have assumed a compact structure, which is opaque, white, and greasy to the nail; so that this passage of a zeolitic mineral into fine soft clay seems not to be uncommon. Crossing to the western ridge of the island, we have this effusion, as before stated, amidst the aqueous strata, apparently possessing all the ingredients of the blue trappite seen in the quarry at Nowrojee Hill, but without the semi-crystalline structure. The blue earth is evident, but the rest of the ingredients have taken on an earthy, argillaceous state, and have become more or less impregnated with calc-spar, which causes this rock to effervesce when touched with nitric acid. From the wells on Malabar Point it comes out partly in the form of a clay rock of uniform fine structure, and blue color, still effervescing with nitric acid. In some portions of this there are small angular fragments of a white color, which seem to be parts of the fresh-water strata, and thus identify this breccia with an effusion which by-and-bye we shall find widely spread on the other side of the island. At Worlee, where this rock is exposed, it is of a bright red brick color, and filled

with fragments of the preceding formation; and at the Sluices it is of a bluish color, and envelopes large masses of carboniferous shale, besides being impregnated throughout with a naphthous odour; while between these two places it is found in a decomposed amygdaloidal state. Where it appears on the sea shore, at Malabar Hill, pieces of open scoriæ are imbedded in it—the only instances of the kind I have met with in the island of Bombay. At the cut in the Sluices the rock is seen filling the internal angle of the anticlinal elevation of the aqueous strata; appearing, as before stated, to have been the agent by which the whole of this ridge has been elevated. It is seen in many parts of the Flats much in the same state as in the western ridge, having, in short, intercallated and broken up the fresh-water strata more or less throughout the island. North of a line extending from Parell to Worlee the whole of the Flats under the clay is covered with the thin stratum, composed of the casts of cyprides, which has been chertified, and rendered more or less jaspideous by heat; thus affording a serviceable material for forming the surface of the railway in this part of the island.

Hence we have seen, that the second effusion in its purest form at Nowrojee Hill is a trappite, and that this trappite passes into aphanite, —the latter may be seen taking place within a few yards, in some small tanks and excavations on the eastern side of the railroad, towards the middle of the island. We have also seen the trappite in other places passing into an amygdaloid, the cavities of which are filled either with laumonite, quartz, green-earth, calc-spar, or fine white clay, (decomposed laumonite?) according to the locality; also that in some places it contains more or less fragments of the aqueous strata; is sometimes a blue compact hard clay; sometimes a breccia; and, last of all, that it may have an earthy or semi-crystalline base, colored blue, green, brown, yellow, or red.

We do not see the trappite or amygdaloid form of this effusion anywhere breaking through the basalto-dioritic tract; at the same time we see it interlaminating to an extreme degree the fresh-water strata; from which it may be inferred that it was thrown out under a great weight, and that this superincumbent weight was the basalto-dioritic tract. But for this extreme interlamination, it might have been doubtful whether it had not been thrown out while yet the aqueous strata were in process of being deposited, and that there was then an interval again, during which more aqueous strata were deposited; and, last of all, the basalto-dioritic tract poured forth over the whole. It is, however, almost impossible that in such loose soft strata as those composing

the fresh-water formation, an interlaminating intrusion of the igneous rock should take place to such an extent as we see it, without the presence of a superincumbent weight, such as the basalto-dioritic tract must have formed; it would rather have burst through the whole of the thickness of these strata in the form of a great dyke, and then have overflowed them. On the other hand, its amygdaloid form chiefly distinguishes it from the basalt and diorite of the basalto-dioritic tract. The late Capt. Newbold has observed (Jl. As. Soc. Bengal, vol. xiv. p. 204) that in the Southern Mahrata Country, "both these rocks [old and new greenstones] are distinguished mineralogically from the tertiary or overlying traps, by their rarely assuming an amygdaloid character, and their freedom from agates, opals, calcedonies, zeolites, green-earth, olivine, &c. so abundant in the latter."

Thus the third fact becomes evident, viz. that the second effusion was one cause, if not the first and principal, of the displacement of the fresh-water formation, and the basalto-dioritic tract.

Third Effusion.—We have now a fourth fact to establish, and that is the occurrence of a third volcanic effusion, by which the strata of the fresh-water formation and other rocks have been thoroughly broken up, and converted into a volcanic breccia, forming a large tract. This tract extends from Carnac Bunder to Sion Causeway, and forms the entire of the chain of hills bordering the north-eastern end of the island, from the Fort of Sewree to Sion, inclusive. It would be difficult to prove that it was a subsequent effusion to the last mentioned, were not large portions of both the basalto-dioritic tract and the amgydaloidal effusion mixed up with the fragments of the aqueous strata. But the presence of the amgydaloid alone, places this beyond a doubt.

Let us now trace this volcanic breccia throughout its whole extent; but, before doing so, it would be as well to premise that the igneous matter binding together its fragments is aphanitic, and for the most part of a white color, speckled with brown, but passes from blue, which is probably its original color, to green, yellow, brown, red, and, lastly, black, varying according to its compactness, and extent of decomposition. It is generally earthy, sometimes where decomposed sandy, and in some parts hard or wholly jaspideous.

Commencing from Carnac Bunder or its southern extremity, we find this effusion for the most part white, and extended over a large area, which is covered by the sea at high tides. Large fragments of the fresh-water formation are here seen imbedded in it, as well as fragments of the other rocks, some of the former six feet long, and still retaining their thinly laminated appearance, and so plentiful that the whole mass

assumes a dark color from their presence, but this will be found to be confined principally to the surface. Tracing this volcanic breccia northwards, we find it passing under Mazagon Hill, the base of which it forms; and the wells in it on the northern side, extending downward for 60 feet without passing through it, show how thick it is. Here, also, we see that the brecciated part is chiefly confined to the surface. The newly excavated contents of these wells also show that some way down this effusion is extremely white, like lime, but it is chiefly composed of silex: when I was examining them some people were taking portions away to white-wash their houses. In some parts also it is mottled blue and green, or red, and in structure is granulo-pastic. We now find it bordered on the eastern side by the second dioritic ridge, which probably overlies it; and in the neighbourhood of Tank Bunder its brecciated form appears in perfection. All the rocks of which it is composed are here seen in large masses, or in comminuted fragments, varying in size with the locality, and with the coarseness of the breccia; but what is most remarkable is its separation in some parts into polygonal or prismatic divisions, at once proving that it is of volcanic origin. From Tank Bunder it may be traced on to Chinchpoogly Hill, keeping principally to the shore, and thence to Jakaryah's Bunder, where it assumes the form of sand of a yellow color, imbedding large fragments of the aqueous strata in a red or black jaspideous state. From thence to under Dr. Buist's house, nearly opposite Sewree, it may be seen passing in between the less disturbed aqueous strata which here lie beneath the second effusion, and on arriving at Sewree itself we come to the tract of it which extends uninterruptedly to the northern end of the island, forming every hill and mound between Sewree and Sion; thus covering an area of about three and a half miles long, and in its broadest part three-quarters of a mile wide. It will surprise the observer at first to find that it assumes the appearance and structure of a coarse black homogeneous jasper at Sewree; but, if he examines this carefully, he will see in parts of it which are washed by the waves, large fragments of diorite and amygdaloid rock; and when he comes to approach Antop Hill from the west, which is still more homogeneous and jaspideous, he will find that he walks over the light-colored volcanic breccia first, and then over a blacker and blacker colored, until the fragments of stratified rock become mingled more and more with the igneous effusion, and at length disappear altogether, giving place to the homogeneous composition mentioned. It was here, in the plain between the village of Wadalla and Antop Hill, that Dr. Leith pointed out to me, in a semi-jaspideous group of black rocks, a large piece of

coarse-grained white crystalline diorite, looking at first sight like granite or syenite, also other portions of diorite, all of which are larger grained than any which is to be found on the surface of the island of Bombay. These, then, must have been brought up from a depth by the igneous effusion, and it may be questionable whether they are not portions of the rock on which the fresh-water formation rests. Striking as the gradual passage just mentioned of volcanic breccia from one state into another may appear, the sudden transition of the black jasper of Antop Hill into the light colored breccia of the one adjoining it is much more remarkable, for in the latter instance you may almost put one foot on one and the other foot on the other, though they belong to the same effusion. After Antop Hill all the others in this neighbourhood, some upwards of 130 feet high, are composed of a light reddish-colored breccia, compact externally, that is where it is not decomposing. In some parts the fragments composing it are all small, and in others large and small, but all sharply angular. Here and there, also, may be seen polygonal divisions on the surface, indicative of the prismatic form common to basaltic rocks. I am led to believe that this breccia forms a great part of the mountains in Salsette, and have seen it myself there forming those both of the northern and southern extremities of this island.

Let us now return to the neighbourhood of Mazagon, where the diorite remains continuous over a larger area than in any other part of the island; and here we shall find that almost all the wells pass through it into this white brecciated effusion. Where this is not the case, they are more or less veined or dyked with it, and in several places we may observe that it has broken through the diorite, and spread itself for a short distance over its surface, showing clearly that it must have been a subsequent effusion to the diorite at least. Indeed, when we come to consider that the diorite overlies the aqueous strata, we can easily conceive how it should be underlaid by the second and third igneous effusions, which have followed the course of these strata; but it is only the latter effusion which seems to have burst through the diorite.

We have now traced this effusion coming from under the base of the eastern ridges throughout its whole length; and we have seen it forming the plain and hills in the north-east part of the island; we have also seen it forming the lower part of the wells in the dioritic tract of Mazagon, and we have seen it veining and dyking, and at last bursting through this rock in the same locality; but we have still another place left to examine it, where it forms half the ridge between Chinchpoogly

and Parell Flag-staff Hill. Here it begins to issue 600 yards south of the latter from a dyke, which descends rapidly on the eastern side of the ridge, separated from the diorite above by about six feet of amygdaloid, belonging to the second effusion, to which I have already alluded, (page 192,) and below by the same amygdaloid, partly in a fresh and partly in a decomposed state. The volcanic breccia here is chiefly composed of the white powdery aphanite before mentioned, with brown specks, the former melting into a white porcelain globule with borax, the latter attracted by the magnet after exposure to heat. It contains but few fragments of the other rocks, and its chief peculiarity—that, indeed, which distinguishes it from all other effusions of the island—is that it is filled with cells which are elongated horizontally, as well as large and small geodes, which contain crystals of hyalin or amethystine quartz, calcedony, or agate. The geodes are for the most part compressed vertically, and some are a foot in length, and contain crystals an inch long, and proportionally thick; the rock is decomposing, and the cells and geodes, which have been filled by infiltrated agate or calcedony, are lying about the neighbourhood, affording a good example of the way in which the so-called agate and cornelian mines are formed. This rock, which issues at the point mentioned, is continued on, forming the eastern side *only* of the ridge for some distance, when it crosses it diagonally to attain the western declivity of Parell Flag-staff Hill, down which it extends for a short distance, and there ends. Just at this part the road from the Horticultural Gardens to Parell passes over it.

One observation only remains for me to state respecting this effusion, viz. there is a dyke of it seen passing up through the westernmost of the hills at Sion, through the base of which the railway has been cut, and by which its existence has been made evident. It contains portions of the fawn-colored amygdaloid of the second effusion, ("White Trap,") which, it will be remembered, exists close by in a large tract at the village of Dharavee. The cellular cavities of the fragments are also filled with the fine white greasy earth which I have stated to be a pseudomorph, if not a decomposed form, of laumonite. This dyke, which is 16 feet wide, and rises at an angle of 80°, is inclined towards the south, but, from the red color of the breccia through which it passes, it is fast becoming discolored, and in a short time will be undistinguishable on the surface from the rest of the rock. There is another dyke of it in a cut of the road towards Trombay, just on the other side of the Causeway, in the island of Salsette, which is two and a half feet wide: it has a nearly vertical direction, and passes between the diorite on one side and the red breccia on the other. These dykes, then,

constitute a *Fourth Effusion*, from their passing through the third effusion.

In all the effusions subsequent to the basalto-dioritic, calc-spar abounds more or less, which is not the case with the latter, in which it is rarely if ever seen. In the blue amygdaloid aphanite at Baboola Tank it is common in large cavities, with laumonite, occurring massive or in pyramidal crystals; and in a fragment of the fresh-water strata about a foot in thickness, and many yards square, which was cut through in sinking a well at the south-eastern corner of the tank, the calc-spar especially abounded in the cavities following the line of the stratum. This was the case, too, in a well which was excavated at Paidhonee, in the centre of the Native Town. Throughout the more brecciated portion of these effusions it is disseminated in small masses, or veins, or mixed up with the rock generally, and, indeed, wherever there are portions of the fresh-water strata present there is almost sure to be more or less calc-spar, though the former are essentially argillaceous; while the opposite is the case in the other parts of the igneous rock, which are not mixed up with the fresh-water strata. With the exception of a little pyrites here and there, calc-spar is the only accessory mineral worth mentioning in these effusions.

The compactness of the volcanic breccia varies very much: in some parts it is exceedingly hard and tough, as at Carnac and Tank Bunders, especially towards the surface, where the mass is in polygonal divisions; but towards the interior it becomes soft. In a well which was excavated into it through the dioritic ridge nearly opposite Sewree, it cut like cheese, and so similar in consistence was the whole, that but for the fresh smooth section I could not have distinguished the angular fragments. In other parts, again, where it is exposed, it is loose and sandy, but, from the presence of argil, always of sufficient consistence to keep together.

From the protean nature of these effusions, then, it is not unlikely that some of them should resemble the rock called *Laterite*, which is so widely spread throughout the basaltic district of Western India, and such is the case. It may not be uninteresting, then, to compare the two; but, before doing so, let us shortly review the opinions and descriptions that have been given respecting *laterite*, and for this purpose I shall quote largely from Mr. Cole's interesting paper on this rock, published in the Madras Journal of Literature and Science, vol. iv. 1836, p. 105.

Characters of Laterite.—Dr. Buchanan, (Gleanings of Science, May 1831,) who first described and named this formation, states that "it is

full of cavities and pores, and contains a very large quantity of iron, in the form of red and yellow ochres. In the mass, while excluded from the air, it is so soft that any iron instrument readily cuts it," but after exposure becomes "as hard as brick." He never observed any "animal or vegetable exuviæ" in it, but had heard of such having "been found immersed in its substance": it blackens externally on exposure, and is found universally overlying granite. Dr. Buchanan nowhere mentions its association with trappean rocks. But Dr. Christie (Mad. Jl. vol. iv. p. 468) states that "it is found resting in different situations, on granite, transition rocks, trap, and sandstone." We see it at Mahableshwar capping all the trappean mountains upwards of 100 feet thick, as well as I can remember, and giving them flat tops; and I am informed by Mr. N. A. Dalzell that in the cliffs on the Malabar Coast about Rutnagherry it may be seen even overlain by basalt.

Mr. B. Babington considered *laterite* to be composed of the detritus of syenitic rock, and to be alluvial, "formed from the washings of the Ghaut mountains." He states that "the hornblende uniformly decays into a red oxide, [of iron?] and the felspar into porcelain earth"; that it forms rounded hills below the Ghauts; and, between Tellichery and Madras, he accounts for its cellular structure by the rain washing away its white parts, and leaving the red.

Dr. Voysey, who seems to have had the clearest conception on these matters of any Indian Geologist with whose writings I am acquainted, made the following statement in a letter to General Cullen, dated 5th November 1820, copy of which appears in Mr. Cole's paper:—"The indurated clay you mention is very probably the result of those muddy eruptions so common, and of such extensive occurrence, in South America. Indeed, I am convinced that the greenstone, [diorite?] basalt, wacke, [aphanite?] iron clay, or laterite, and the indurated clay, have all a common origin, from the insensible degrees by which they pass the one into the other; and they only differ as to the degree of pressure to which they have been subjected when under fusion."

Again he mentions, (Jl. As. Soc. Bengal, Aug. 1833, p. 400,) when alluding to the passage of basalt into wacken, [aphanite?] and then into iron clay, [laterite?] that the latter takes place "in the space of a few yards."

Dr. Christie *(loc. cit.)* calls the laterite of Buchanan a "clay-stone conglomerate," (pp. 462 and 468,) and states respecting its position in the district of Dharwar that it is found "principally in its western parts, and on the summits of the Ghauts."

Mr. Cole states of a specimen of laterite from Nellore, given him

by the late Dr. Malcolmson, that "it was filled with innumerable minute pebbles of quartz, rarely larger than half the size of a pea, sometimes pellucid, generally much rounded; together with yellow and ochraceous earths." These would seem to have been the miliary contents of an amygdaloid,—whether *in situ*, or in a decomposed or altered rock, or forming foreign substances in a subsequent effusion, I cannot pretend to decide, but I should think the former.

Mr. Cole also quotes Mr. Coulthard, (As. Res. vol. xviii.) whose observations appear to favor this supposition, viz. that "the iron clay" about the Sagar district, and which is easy to be met with everywhere there, "is for the most part amygdaloidal."

Lastly, Mr. Cole himself states of the "Red Hills" at Madras, in the banks (15 feet high) of the old channel, leading into what is termed the lake, that "They are composed of a dark ferruginous stone, arranged in a stratiform manner, presenting seams or partings, two or more feet asunder, parallel to each other, and nearly horizontal. Vertical fissures intersect the seams at right angles, and thus produce prismatic masses of rock." The rock is a "conglomerate," consisting of nodules of various sizes, imbedded in a "clayey paste," which is hard and tenaceous: they are "water-worn," but present a "considerable angularity of surface, yet still sufficiently rounded to indicate their having undergone attrition"; in size they range from "a filbert to masses a foot or more in diameter. Their fracture exhibits the structure of a coarse-grained sandstone, or grit, of a deep chocolate or claret hue." "Small masses of white earth-like lithomarge and mica are sparingly scattered in the sandstone nodules." On ascending the hill on the side of the lake, the conglomerate disappears, and changes into the more characteristic laterite, red and cavernous, with "tortuous cavities"; still, however, containing fragments of the sandstone, seemingly united "by the *debris* of the sandstone itself, of iron ores, and lithomargic earth." (Pp. 110 and 111, *op. cit.*)

How much, then, do all these descriptions approximate the subsequent effusions in the island of Bombay to *laterite!* The external surface of the hills at Sion, and the cuttings of the railway in them, show that they are composed of a red argillaceous and ferruginous base, filled with cavities, containing white or yellowish lithomargic earth, this lithomargic earth principally consisting of decomposed laumonite, or its pseudomorph in the form of white green-earth; the masses hard superficially, and soft or sectile internally; with more or less fragments of the fresh-water strata, diorite, and amygdaloidal rocks. Nor is it strange, if these subsequent effusions should be identical with the *laterite*, that in the latter should,

under certain circumstances, be organic remains; for in the former we have masses of black shale, as at the Sluices, consisting almost entirely of organic remains; and a hundred other instances might be adduced in the second and third effusions, where the organic remains are not only in masses of shale, but entirely isolated from it, and alone in the igneous rock,—to wit the scattered pieces of wood, &c. &c. found in it at the Sluices, and the frog-bones at Malabar Hill.

The late Captain Newbold has observed that at Pondicherry the *laterite* "occasionally possesses a distinctly stratified and conglomerate character, and passes into a loose coarse sandstone, imbedding silicified wood; and at Beejpoor, on the Malabar Coast, it passes into loose sandstone, imbedding layers of lignite": also that General Cullen had discovered "lignite and carbonized seeds in the laterite of Quilon and Travancore." (Jl. As. Soc. Bengal, vol. xiv. p. 299.)

And the following description of the rock, which forms the upper part of the hills in the "Rajmahal Coal Formation," about 130 miles N.W. of Calcutta—which would very nearly do for that of the subsequent effusions in the island of Bombay—is another illustration of it:—

"151. The higher ridges of these mountains consist of scoriform masses of red earthy vesicular conglomerate, (laterite,) containing angular and other fragments of altered coal-measure shales, ferruginous and micaceous sandstone, imbedded in a semi-vitrified and vesicular matrix. These ridges are without any signs of stratification, except where detached masses of altered coal formation occur; while the upper portion of their declivities, as well as all the lower and intermediate ridges, are composed either entirely of amygdaloidal trap, containing zeolites and calcedony, or altered coal-measure sandstone and shale, the latter passing into the small isolated patches of coal-measures which are found in some of the narrow valleys and ravines mentioned." (*Report of the Geological Survey of India, for the Season of* 1848-49, by J. M'Clelland, Surgeon, Bengal Service, p. 45.)

Thus we have the *lateritic* effusion—for such Dr. M'Clelland evidently conjectures that of the Rajmahal Mountains to be—at the three points of the great triangle, formed by Madras in the south, the Rajmahal Hills in the east, and the island of Bombay in the west.

Again, we may see at Dharavee, in Bombay, the light fawn-colored aphanitic rock, called "White Trap," and which I presume is equivalent to Dr. Voysey's wacke, decomposing, and passing, as he has described the latter, within a few yards, into a mottled white and red decomposing rock, with cellular cavities, filled with the soft greasy white clay

mentioned, thus confirming what this acute observer has so clearly stated in his letter to General Cullen, viz. "that the greenstone, [diorite?] basalt, wacke, [aphanite?] iron clay or laterite, and the indurated clay, have all a common origin"; and I need hardly now add that this is volcanic,—to illustrate which by analogy, I might state, that as a stream of water passing from a clear lake to the sea becomes discolored by the kind of detritus which it takes up on its way, still remaining pure at its source, so a volcanic stream, on its way to the earth's surface, may, from the nature of the rocks through which it passes, be converted into the various forms met with in the *laterite*. I do not mean to assert that such effusions are in the same state now as when they were first poured forth; for we know from every-day experience that the most compact rocks, like all other things, have but a stated time to go through their different phases; that a re-arrangement of particles is continually taking place in them; that some are carried away, and replaced by others; that others are carried away, and leave nothing but their empty cavities,—color, substance, form, all is sooner or later changed and dissipated. But in the volcanic matter which has become *laterite*, the presence of foreign material does seem to have curtailed to a certain degree its vitality, so to speak, and to have caused it to decay sooner than it otherwise would have done; and I think, when among the trappean rocks we do not observe the common forms of structure and colors peculiar to them, both in their compact and decomposing states, we may infer the presence of this foreign material, though it is not demonstrable to our senses. Why the *laterite* should be so impregnated with iron, and the red color so developed in it, seems not less inexplicable than that of the New Red Sandstone,—the Rothliegendes or Exeter Conglomerate of which it so closely resembles. Mr. Logan's hypothesis, that when the red color has extended into other rocks the agency of "volcanic steam, gases, or fluids charged with iron," may be called into account for their red disintegration, seems very tenable—that is where they have not enough iron in them otherwise. Indeed, his hypothesis throughout will be found hardly less applicable to the island of Singapore than it is to that of Bombay. (Jl. As. Soc. Bengal, vol. xvi. part 1, p. 534.)

The very genuine pieces of *laterite* only differ from the rock of the hills at Sion in being more ferriferous, and in presenting a cavernous structure, composed of sinuous instead of irregular spheroidal cavities; such differences bearing no comparison with those which exist between the red brecciated hills at Sion and the black jaspideous hills of Antop and Sewree, though they are both parts of the same formation.

Thus the subsequent effusions in Bombay would appear to be identical in origin, and almost so in structure and composition, with the *laterite*, though the latter has been stated not to come further north than the Bancote River, which is 60 miles south of Bombay. And it should be remembered that this breccia is not confined to the island of Bombay—that, indeed, we only have a specimen of it here; but that it forms the principal part of the mountains in Salsette, and may be seen at the northern extremity of that island, viz. at Ghora Bunder, which is 18 miles from Bombay, containing there, as in Bombay, large pieces of aqueous strata, apparently identical with those of the fresh-water formation in Bombay. How far further north or south it may extend is not yet known; but if the masses of aqueous strata in it be really indentical with the fresh-water ones of Bombay, their existence at Ghora Bunder not only proves that the volcanic breccia extends so far, but that the lake or river in which these fresh-water strata were deposited must have also extended this distance.

There is one fact more which I forgot to mention, and which is still further confirmatory of Dr. Voysey's opinion respecting the common origin of greenstone, basalt, wacke, and laterite, viz. that much of the third effusion or volcanic breccia, which I think we must now regard as *lateritic*, if not genuine *laterite*, is in the state of kaolin, and when pieces of it are well washed with a brush in water, they present, in like manner, the angular parts of the undecomposed grains, possessing the same greenish tint and appearance as those of the fine-grained diorite of the basalto-dioritic tract.

Having now gone over the *fresh-water formation*; the first effusion, or *basalto-dioritic*; the second, or *amygdaloidal* effusion; the third effusion, or *volcanic breccia*, and the *dykes* of the same, which constitute the fourth effusion,—indeed all the ancient formations,—let us now go to the modern ones, viz. those of the Pliocene Age, the geological age of the others being as yet undeterminable.

This modern series merely consists of the *clay* which fills up the central or lagoonal depression of the island, and the *shell-beaches* which overlay it in Back Bay, the neighbourhood of Mahim, and at Sewree.

Clay.—This is a stiff plastic deposit, of a fine uniform structure, not effervescing with acids: the color is brown above, blue below, and then yellowish, where it rests upon or mingles with the decomposing igneous rock, or the remains of the fresh-water strata. Its thickness of course varies with the irregularities of the igneous rock beneath, but it diminishes also gradually towards the sea, or where it passes under the shell-beaches. Thus, at the southern part of the island, within three

quarters of a mile of Back Bay, it is 10 feet thick; after this it diminishes in thickness towards the sea in Back Bay, and 600 yards from the latter, where it is yet overlaid by the shell-beach, it is only 4½ feet thick, and of a blue color: still nearer the sea it seems to disappear altogether, for it was not met with in a well 20 feet deep in the Girgaum Road, about 300 yards from it.

The same thinning out probably takes place under the shell-beach of Mahim, at the northern end of the island; but there I have not had the same opportunity of examining it.

This clay is also met with at Sewree, where Dr. Buist, who has paid much attention to the formation, pointed it out to me. There the sea is exposing it, and scarping the shell-beach which overlies it, by which one might infer that this portion of the island was undergoing elevation.

Like most argillaceous deposits, it contains very few organic remains: the shells are almost all confined to the beaches which overlap it—still here and there it does present a few scattered ones. At Sewree, at Mahim, and under the beach at Back Bay, it contains a good deal of wood, probably the stumps of mangrove trees, which originally grew in it. This wood seems to be chiefly confined to the parts mentioned, and presents a number of calcareous tubes, which are straight or undulous, and from a half to three quarters of an inch in diameter. They are more or less filled with calcareous infiltrations, and originally were formed round the borings of some pholadine animal. The wood itself is in a spongy expanded state, and contracts remarkably on drying; assuming a compact solid form, which breaks with a smooth or resinous fracture, and presents a semi-carbonized appearance of a deep black brown color, very much like coal. It burns, however, more like wood, readily, and with a bright flame, emitting a great deal of smoke, and woody odour; also leaving a white ash. In different parts of the lower clay, oyster shells are found, adhering to boulders and loose stones, the same as those now found on the shores. Pholadine tubes, infiltrated with calcareous matter, also abound throughout the clay, and here and there the remains of crab-shells, &c. I have not met with any remains of man, or any other animals, in the clay, and no pottery, or anything resembling an artificial construction, I believe, has been found in it.

There is a feature of this clay, however, which is very remarkable, viz. the *Kunkur formation*. This, which consists of concretionary limestone, occurs massive, or scattered throughout the clay in small isolated portions. In its massive state it is found in large boulders, or in continuous tracts, reposing on the fresh-water strata or igneous rock beneath, and in this state is compact and cavernous, enclosing portions of

the clay in its cavities, &c. in which it has been formed, or as a conglomerate with sandy or gravelly detritus from the igneous rocks, and the remains of small shells, assimilating it to the sandy beaches. Those portions which are scattered throughout the clay are more or less round, like septaria; very uniform in structure, and some so pure that they wholly dissolve in nitric acid. They are generally of a blue color, but sometimes quite white, and identical with chalk. Like septaria also, they are irregular, and almost invariably envelope the remains of some organic matter, such as pieces of reeds, wood, the remnants of crab-shells, &c. &c. which are very frequently removed, and leave nothing but their moulds in the centre of the concretions. This substance also accumulates in the interior of shells, and almost always fills the cavities of pholadinæ tubes which have been formed in the clay. It does not always, however, envelope organic remains, but may be seen appended to them in a globular form—to the pincher of a crab-claw for instance. Occasionally it may be seen in a vertical section of the clay, in the state of a number of isolated particles or concretionary nuclei round a piece of wood, as if in process of forming a nodule, not by successive layers, but by the increase of substance round different centres. It will hardly be asked where this lime comes from, when we have seen so much of it in the igneous rocks, and in the laumonite filling their cellular cavities, which mineral contains twelve per cent. of lime.

Beaches.—Lastly, we come to the sandy beaches, which are chiefly found on the northern and southern sides of the island, and not on the western or eastern sides: not on the western, because the whole is composed of black basaltic rocks, extending probably for a long distance into the sea; and not on the eastern side, because there are no waves to throw it up, since wave-action, combined with the presence of sand, &c. is of course absolutely necessary for this purpose. Hence it is at the mouths of estuaries such as these, emptying themselves into the sea on the north and south of the island of Bombay, that we chiefly find such beaches: the sand is brought down by them, and, when flowing into the sea, is there turned back by the waves upon that part of the shore which by its form and position is best adapted to receive and retain it. Thus we see the chief accumulation of this sand in Back Bay and at Mahim, the former on the north, the latter on the south side of the island; and each of these beaches presenting their concavities to the N.W. and S.W. respectively, from the inner side of the island being so much longer than the outside. At Sewree, also, which presents a short shore with a southerly aspect, there is a

small beach-accumulation, which seems to have been thrown up by the swell of the South-west Monsoon, as it falls almost point-blank upon this bit of shore on its way up the harbour. Also, in the centre of the island, there is a patch of beach six feet thick, called Phipps' Oart, from which the railroad contractors have obtained sand for the surface of the railroad. At first it appears thoroughly isolated, and difficult to account for, but when we observe a breach in the eastern and western ridges of the island immediately opposite it, and see the remains of shells and sand, scattered over the surface of the clay in a line between these two breaches, we no longer hesitate in applying the same reasons for its occurrence here that we have in other places, viz. that through the breach in the eastern ridge came sand from the harbour, and through the breach in the western ridge, viz. that at the Vellard, came the waves from the sea which ponded it back, and formed the mound mentioned. At that time the island must have been divided into two parts, and the cause of this being discontinued would seem to be sought for in its subsequent elevation; but the summit of the mound of sand and shells called Phipps' Oart not being more than about nine feet above the sea at high-water, and the latter kept from overflowing a great part of the Flats by embankments, the drying up of the island would seem to be more from the accumulation of detritus brought down from the hills on the main land than from anything else.

At Mahim, the beach is two miles and a half long, and extends 1000 yards inland, and at Back Bay it is two miles and three quarters long, and extends about 600 yards inland, forming segments of large circles at each place. The thickest part of the latter appears to be its western end, where the South-west Monsoon swell beats most upon it, for about its centre, viz. 300 yards from the sea, it is 20 feet thick, 18 feet on the Esplanade opposite the Sanatarium, and towards the southern extremity of the Esplanade 15 feet thick, where it rests on the igneous rocks, and large spheroidal masses of coral *(Cellastrea* Bl.*)*

With the composition of these beach-accumulations we are perfectly acquainted from the wells that have been dug through them. As before stated, the clay thins outwards under them, and they, in return, inland, thin out upon the clay, but have of course always that ridge above the clay which is common to beach-accumulations.

Not having had the opportunities of examining the beach at Mahim that I have of that in Back Bay, though they are both probably alike, I must take my description from the latter. It is composed of beds of yellow sand and small shells, resting on the clay, or on the igneous rocks of the locality, according to that portion of it which is nearest

the sea, and *vice versâ*. The sand is chiefly confined to the upper part, but a few feet down begins to present beds of small sea-shells, for the most part entire. These increase in quantity, and take the place of the sand, while they become cemented together by calcareous matter, and form a concrete mass, which furnishes a rough building stone. The shells for the most part chiefly consist of small bivalves, *Cardium* and *Tellina*; also of small univalves, *Turbo*, *Cerithium*, and *Nerita*; a large *trochus* and *turritella*, and a thin pearly *placuna*; in short species of all the genera which are now found on that part of the beach which is in process of formation. As before stated, these materials rest on the clay or the igneous rock, and probably in some places on the lacustrine strata, where the latter have not been carried alway by denudation. I have frequently looked among the portions which have been quarried for bones of the human skeleton, and for remnants of pottery, but have never met with either.

This concludes all that I have to offer on the Geology of the Island of Bombay, with the exception of the few following "practical observations."

Building Materials.—The most durable stone is that which caps the basalto-dioritic tract, viz. at Nowrojee Hill, &c. but it is very tough; the next is a more crystalline form, which lies below it; this is much more cleavable, and is found all along the eastern ridge. After this comes a more earthy form, (trappite,) which is found at the base of Nowrojee Hill Quarry; also the so-called "white trap" (aphanite) at Dharavee, a modification of which (spilite) is again met with on the eastern side of the Flats, about the middle of the island, near the railroad, made up partly of carbonate of lime, in the form of calc-spar, &c. It is with this that the principal part of the stone-work of the railway is built; and although not so durable as any of the foregoing, is sufficiently so for economical purposes. Last of all comes the volcanic breccia, in the neighbourhood of Sion, which furnishes a very rough stone, but from its soft argillaceous nature when fresh hewn, and subsequent hardening, it serves very well for troughs, for which it was formerly much used.

Lime.—The concretionary limestone called kunkur, lying at the bottom of the clay in the Flats, in detached masses, or in continuous tracts, together with the nodular forms in the clay itself, furnishes an abundance of lime, the purest coming from the nodules. Recent shells, however, are collected and burnt for this purpose, from their furnishing a still purer material.

Sand.—This comes from the shell-beaches, and, being chiefly com-

posed of the detritus of small shells and argillaceous matter from the disintegrated trappean rocks and fresh-water strata, hardly contains any siliceous sand; hence it makes very bad mortar: much of it being taken from the sea shore also, it is more or less impregnated with salt, which after a while makes the mortar crumble, and, where this is covered with plaster, the latter to fall off. It has always appeared to me a great defect in the plastering of this part of India, not to mix hair, or tow, or straw, with the material. All who have had anything to do with new buildings in Bombay must have seen the plaster frequently falling off from the circumstances I have mentioned, and that no secondary plaster ever stays long on such surfaces. Hence the necessity of taking sand from parts which have been long exposed to the percolation of fresh water, and which is free from salt, and mixing some fibrous material with the plaster, to make both it and the mortar more durable. It is no light matter this in the construction of a building, for without it the expense of repairs will ever be as it is now, endless, and the appearance of the buildings squalid and disgraceful, although an unlimited amount of money may be expended upon them annually.

Wells.—The only rule that can be laid down for digging wells is that the basalto-dioritic tract must be pierced through to the fresh-water strata, and even then there may be no water: for a foot or two below this there may be an intrusion of the igneous rock, and then this must be pierced until arriving at another layer of the fresh-water strata, and so on until water is reached. Sometimes the meeting with a rent in boring through the basalto-dioritic tract, or a dyke of the subsequent igneous effusion, may, by communicating with water below, yield the latter before it could otherwise be expected; but from the manner in which the fresh-water strata and superincumbent basalto-dioritic tract have been broken up and intruded throughout the island, by the subsequent igneous effusions, it is plain that none of these springs can be inexhaustible. Last year proved it, for nearly all the wells were dry from the scarcity of rain the year before. There is another fact, viz. that many of these rents and dykes let in a spring of brackish water: this is particularly the case in the neighbourhood of Byculla. Experience there has often exemplified the proverb, that "you may go further and fare worse." This was the case in a tank enlarged by Sir Jamsetjee Jejeebhoy on the north side of the Grant College. In sinking a well at the south-western corner of Baboola Tank last year, too, the workmen came upon a thin line of the fresh-water strata, accompanied by an oozing of saltish water, and of course were ordered to cease further operations directly. How it comes to pass that this

water should be brackish I can only conjecture; for it is not owing to the presence of the white rock, (or subsequent effusions,) since at Mazagon there is a well 60 feet deep, entirely excavated in the latter, and yet yielding excellent water. Again, the tank mentioned, which was enlarged by Sir Jamsetjee Jejeebhoy, does not extend into the white rock, and yet the water in it is so brackish that it is hardly fit for anything but watering the roads. Two tanks or wells shall be found within a few yards of each other, the one containing drinkable the other undrinkable water. As I have before stated, all that I can offer in explanation of this is conjectural, viz. that when the basalto-dioritic tract and aqueous strata were broken up by the subsequent effusions, the sea water may have run into the crevices, and there, becoming vapourized, have left its salt behind it; or, otherwise, the sea at the present time may be sucked up by these rents and dykes, which by their intercommunication may carry it here and there throughout that part of the island where the brackish wells are most common. If the former opinion were entertainable, then the constant emptying of these wells should at last make them yield fresh water; but this is not the case, for they are emptied yearly for watering the gardens, and still continue to be salt. At the same time, those which are never emptied are decidedly the most brackish. If, on the other hand, the latter be the explanation, then there is no remedy for it.

Coal.—The quantities of this mineral found at the cutting of the Sluices, where the fresh-water strata containing it have only been excavated for a few cubic yards, is very trifling, although the fossilized wood and debris of vegetable remains is very considerable. The nature of the coal is described at page 176. It hardly ever occurs in grains larger than a pea, and for the most part in layers over compressed flat long leaves or stems; although the whole of this part of the fresh-water deposit is highly carboniferous. At the same time it should be remembered that in the only place where these strata have been exposed they have been broken up by the intrusion of the igneous rock, and that although the wood and other vegetable remains in them here are principally replaced by argil, yet that they may be more coal-bearing in other parts. A further examination, then, of this part of the fresh-water formation in different localities would be highly interesting, if, even after all, it should not prove useful.

List of Rock-Specimens, Minerals, and Fossils, from the Island of Bombay, illustrative of the foregoing Paper.

Presented by Dr. LEITH, and the Author.

[Those marked with a † were presented by the former, and those with an * by the latter; the † and * together denote that specimens of the same object have been presented by both.]

No.

1 * Tough bluish-grey basaltic diorite, containing olivine, and grains of magnetic iron ore, from the upper part of Nowrojee Hill.
2 * Fissile and more compact, from ditto lower down.
3 * Fine-grained crystalline diorite, from the ridge extending northwards from Jakaryah's Bunder.
4 * Mottled blue and brownish grey diorite, from the ridge extending northwards from Khandlee Battery.
5 * Orbicular or botryoidal diorite, from the same ridge a little south of Tank Bunder.
6 * Tough black fine granular basalt, from hexagonal prisms at Worlee.
7 * Fissile black or dark fine basalt, from beneath the surface Malabar Hill.
8 * Tubes, formed of crystalline quartz, from bottom of basalt Mama Hajanee.

FRESH-WATER STRATA.

9 * Portions of the upper part of the fresh-water strata, from different localities: the light brown from the tank north of the Horticultural Gardens, and upper part of Baboola Tank; the blue from the well (see p. 199) in Baboola Tank; the brown from the spilite on the eastern side of the Flats, nearly opposite Parell; the greenish or bluish grey or brown from the Sluices; the blue and brown from a well on Malabar Hill.
10 * Portions of the stratum composed of the casts of cyprides, from the northern side of the breach at the Sluices; ditto from the northern end of Chinchpoogly ridge.
11 * Greenish grey or brown shale, from the Sluices.
12 * Ditto, with interlaminated black shale, from ditto; also from a well on Malabar Hill.
13 * Black bituminous shale, from ditto, and from a well on Malabar Hill.
14 * Chertified aqueous strata, bent.
15 * Basaltified ditto, with organic impressions.
16 * Jaspidified ribboned ditto.
17 * Chertified portion of cypris-stratum.
18 * Ditto jaspideous ditto.
19 * Coal from the Sluices.
20 * Mineral resin from ditto.

VEGETABLE REMAINS.

Roots.

21 † Cormiform, conical roots? from the Sluices, (several specimens and sections,) (p. 177).

No.

22 † Cormiform, globular, from the Sluices (several specimens and sections).

Stems.

23 *† Cylindrical, (two specimens,) (p. 178).

24 *† Wood, dycotyledonous, several specimens of, large and small,—and monocotyledonous, (bamboo?) (p. 178).

25 *† Ditto with bark, two specimens (p. 178).

26 *† Fungoid or adventitious woody excrescences? in the bark (p. 178).

Leaves.

27 * Oval, small,—like leaflets of an acacia (p. 179).

28 *† Long, flat,—like bulrushes, large and small (p. 180).

29 † Scaly, long leaf, or surface of a stem? (p. 180).

30 † Lanceolate leaves, like those of bamboo (p. 180), also cordate leaves.

31 † Impression of Cyperus?

Seeds.

32 *† Small, flat, lenticular capsule, with a ring of seeds arranged round the internal margin (p. 180).

33 † Seed like *artabotrys odoratissimus* (p. 181).

34 † Siliquose seed-pod (p. 181), with sections (several specimens).

35 † Ditto, (p. 181).

ANIMAL REMAINS.

36 † *Cypris semi-marginata* (H. J. C.) (p. 181).

37 * *Cypris cylindrica* (Sow.) (p. 182).

38 * Another species, *C.* ————? (p. 182).

39 † Lymnadia?

40 † Elytra of a small coleopterous insect, right wing (p. 183).

41 † Impressions of fresh-water shells, Melania?

42 * Do. do. do. Paludina?

43 † Do. do. do. Pupa?

44 *Rana pusilla*, (Owen,) Skeletons of, several specimens (p. 184).

45 Do. do. do. large and small. (In these specimens, though one skeleton appears larger than the other, the thigh bones are all of the same length.)

46 Do. do. do. in different layers an inch apart, (two specimens,) (p. 186).

47 * Do. do. do. on a layer of cyprides.

48 * Do. do. do. bones of, scattered in intruded igneous matter (p. 186).

49 † *Testudo Leithii.* (H. J. C.)—*a* carapace and plastron; *b* ditto with head; *c* head alone; *d* left half of the carapace and plastron; *e* fragment of ditto; *f* ventral part of pelvis and sternum opposite; *g* fragment of carapace, with margino-collar scales; *h* fragments of marginal scales; *i* ditto; *k* ditto; *l* right two-thirds of carapace and plastron.

2ND EFFUSION.

50 * Greenish blue and black trappite, from Nowrojee Hill, below the line of aqueous strata.

No.

51 • Amygdaloid trappite, from Baboola Tank; cells filled with crystals of laumonite.

52 • Laumonite and dog's-tooth calc-spar, from a geode in ditto.

53 • Rhomboidal calc-spar in mass, from ditto ditto.

54 • Ditto ditto following a line of aqueous strata; from do. do. (p. 199).

55 • Ditto ditto in a minute imbricated form, separate, and covering dog's-tooth crystals, from ditto ditto.

56 • Prehnite from ditto ditto.

57 • Amygdaloid trappite, from a tank north of the Horticultural Gardens.

58 • Black fine-grained crystalline diorite, from Baboola Tank.

59 • Compact blue amygdaloid trappite, from Baboola Tank; cells elongated, and filled with massive laumonite.

60 • Greenish grey amygdaloid trappite, cells filled with green-earth, from the neighbourhood of the house called Lowjee Castle.

61 • Ditto decomposing, cells filled with quartz crystals, from upper side of dyke in Chinchpoogly ridge.

62 • Hyalin and amethyst quartz crystals, from crushed geode in ditto.

63 • Amygdaloid with brown earthy base, and cells filled with quartz crystals, from neighbourhood of Sindu Para.

64 • Brown aphanite, the so-called white trap, from Dharavee.

65 • Ditto amygdaloid, from ditto; cells filled with fine white clay-earth, (decomposed green-earth or laumonite,) (p. 193).

66 • The same decomposing into a mottled red and white material, like laterite, of a granulo-plastic nature (pp. 196 & 202).

67 • More earthy aphanite, spilitic, with fragments of organic remains, and calc-spar, from the eastern side of the Flats opposite Parell. Forms a good stone for building, and is easily hewn.

68 • Blue spilite, (aphanite and calc-spar,) calc-spar, disseminated, from ditto.

69 • Brown ditto, with calc-spar in small masses (amygdaloidal) from ditto.

70 • Brown ditto, with calc-spar in veins, from ditto.

71 • Unsymmetrical, compressed, lenticular crystals of calc-spar, standing on their edges in a geode of ditto, from ditto.

72 • Blue spilite, with small crystals of calc-spar, passing downwards into trappite, from ditto.

73 • Fine blue clay aphanite, from a well on Malabar Hill.

74 • Coarse aphanite, from ditto ditto.

75 • Brecciated aphanite, from ditto.

76 • Coarse aphanite, intruding fresh-water strata, from the eastern side of the Flats.

77 • Aphanite bearing fragments of vegetable remains, from ditto.

78 • Ditto black ditto, from a well on Malabar Hill.

79 • Ditto bituminous ditto, from the Sluices.

3RD EFFUSION.

80 • Coarse breccia, from the neighbourhood of Tank Bunder.

No.

81 * Blue breccia, with white fragments, from a well on Malabar Hill: *b* ditto from Sion; *c* ditto brown from ditto; *d* ditto red from ditto; *e* ditto white and red decomposing; *f* ditto red compact.

82 * Ditto black jaspideous from Antop Hill.

83 * Ditto jaspideous, black, from Sewree.

84 * Blue breccia, passing into red clay, from Sewree.

85 † Ditto, containing a large fragment of large-grained diorite, near the village of Wadalla (p. 196).

86 * Ditto, containing amygdaloid diorite; *a* ditto containing amygdaloid trappite or aphanite, from ditto and Sewree.

87 Ditto, containing portions of aqueous strata.

88 * White amygdaloid aphanite; cells very much elongated, and filled with calcedony or quartz crystallized, from Chinchpoogly ridge.

89 Geode from ditto, containing crystals of quartz and amethyst.

90 Ditto from ditto, containing agate.

4TH EFFUSION.

91 * Portion of amygdaloid aphanite, from the dyke at Sewree; cells containing fine white clay-earth.

GHORA BUNDER, IN SALSETTE.

92 * Specimens of amygdaloid aphanite, and volcanic breccia; also specimens of aqueous strata from the latter.

MARINE FORMATION.

93 * Blue clay of the Flats.

94 * Massive kunkur, from lower part of ditto.

95 * Small kunkur-conglomerate, resembling transformed sea-beach, from ditto ditto.

96 * Nodular kunkur, from ditto.

97 * Charred wood, from ditto.

98 * Infiltrated pholadine tubes, from ditto.

99 * Concrete sea-beach, coarse.

100 * Concrete sea-beach, fine.

101 * Shells from ditto.

102 * Spheroidal masses of calcareous coral (*Cellastrea* Bl.) beneath ditto, Esplanade.

EXPLANATION OF THE PLATES.

PLATE VI.

Geological Map of the Island of Bombay.

PLATE VII.

Fig. 1.—Cormiform root of aquatic plant? natural size.

a Upper end, truncated.
b Lower end, broken.

Fig. 2.—Globular root of aquatic plant? natural size.
a Lateral view.
b Upper end, showing lines of petiolations?

Fig. 3.—Lateral view of a portion of a stem, natural size.
a Lower end, showing lines of petiolations?

PLATE VIII.

Fig. 4.—Oval leaf, natural size.

Fig. 5.—Round leaf, natural size.

Fig. 6.—Compressed stem or leaf of aquatic plant, with root, natural size.
a Magnified view of longitudinal striæ on its surface.

Fig. 7.—Scaly impression of leaf or stem, natural size.
a Two scales, well preserved.

Fig. 8.—Form of the end of a flat, long leaf, which is very common, natural size.

Fig. 9.—Impressions of leaves, like those of bamboo, natural size.

Fig. 10.—Impression of a cyperaceous plant? natural size.

PLATE IX.

Fig. 11.—Small lenticular seed, magnified.
a Natural size.

Fig. 12.—Oval, compressed seed, with apparently *ruminate* albumen, magnified.
a Natural size.

Fig. 13.—Seed-pod, broken off at one end, natural size.

Fig. 14.—Seed-pod, natural size.

Fig. 15.—*Cypris semi-marginata.*

Fig. 16.—*C. cylindrica.*

Fig. 17.—*C.* ———— ?

Fig. 18, 19, 20.—Valves of recent cyprides, from the fresh-water deposits of Bombay.

Fig. 21.—Elytra of coleopterous insect, magnified.

Fig. 22.—Cast of shell, natural size.

PLATE X.

Testudo Leithii.—Carapace, and upper part of head of, natural size. *a* Point of tail.

PLATE XI.

Testudo Leithii.—Plastron, and inferior aspect of lower jaw of, natural size. *a* Impressions of posterior extremities. *b b* Union of pelvic bones with posterior part of sternum. *c* Point of tail.

ART. II.—*Recent Investigations in Zend Literature.* By the Revd. J. MURRAY MITCHELL, A.M.

Presented March 1849 and February 1852.

THE first of the two following papers was read a considerable time ago, soon after the appearance of the articles to which it refers, in the *Zeitschrift der Deutschen Morgenländischen Gesellschaft;* but I have hitherto declined to comply with the request of the Society that it should appear in the Journal, in the hope that the important papers of Spiegel and Roth might be given to the English public *in extenso* by some student of Oriental antiquities at home. I see, however, no intimation of any intention to reproduce these papers; the country of Hyde not only seems to have abandoned original investigation into the ancient religious system of Persia, but to be disinclined even to acquaint itself with the progress of Continental scholars in this very interesting field of inquiry. In the absence, then, of a full translation, the following paper is now published, as containing a brief statement of some of the most important conclusions to which the students of Zend literature have at present arrived.

I.

The very rapid progress that has of late years been made in the opening up of the most ancient religious monuments of the Hindus is well known to all who take an interest in Oriental investigation. The Veda is no longer a mystic and unintelligible book. For a considerable time after Colebrooke's Essay on the Vedas was published, it seemed as if the investigation could not advance beyond the point to which he had brought it; but recently the study has been prosecuted with redoubled zeal, and with most satisfactory results.

There is, however, another religious monument of the ancient East, scarcely less interesting than the Veda, on which comparatively little light has as yet been shed. The Zendavesta, the sacred book of the ancient Persians, is still an unintelligible volume. The investigation slumbered from the days of Anquetil du Perron until M. Burnouf took it up. He accomplished much; but notwithstanding his zealous

and successful labours, a deep darkness still enveloped everything pertaining to the ancient books and ancient religious history of the Persians. Light, however, is now breaking in,—we have at least the promise of a dawn; and it is an interesting thing to observe that a considerable portion of the light which is now resting on the Zendavesta is reflected upon it from the Veda.

That the ancient Hindu and ancient Persian races were not very remotely descended from one common stock—now generally denominated the Arian stock—is a fact with which doubtless all present are familiar. A comparison of the languages used by the two races establishes the point to a demonstration. A connexion somewhat similar, although not capable of being traced out to the same extent, exists between the religions of the two races. The points of resemblance here are not merely those which are common to all religions, nor those common to all the religions of the great Indo-Germanic family: they cannot with any show of reason be pronounced either accidental, or the result of intercourse between the two races in later times; but they appear to be based on an original relationship, or rather identity, of the two systems. Each of these throws light upon the other, and the Veda and the Zendavesta—the ancient sacred book of the Hindus, and that of the Persians—ought to be studied in their mutual connexions. The relation of the two books is thus well stated by Dr. Roth:—"The Veda and the Zendavesta are two rivers, flowing from one fountain-head: the stream of the Veda is the fuller and purer, and has remained truer to its original character; that of the Zendavesta has been in various ways polluted, has altered its course, and cannot, with certainty, be traced up to its source."

The Veda and the Zendavesta present two subjects of study that are of very unequal difficulty. The study of the former is by far the easier task. Not to mention that the Sanskrit language, in which it is composed, is still a living language, although doubtless in a form greatly altered from the "rustic dialect" (to use Colebrooke's epithet) of the Veda, we possess admirable commentaries on the Veda written in easy Sanskrit, grammars, lexicons, explanatory notes, &c. &c., which were composed by accomplished Hindus at a time when the study of the Veda was still prosecuted with zeal and success. On the other hand, the Zend must be called a dead language; and to aid us in the study of the Zendavesta we possess a Sanskrit translation of a very small part of the work, a Pehlivi translation, which is as enigmatical as the Zend, the bare rudiments of a lexicon or vocabulary, but not even the rudiments of a grammar. When we add to this slender *apparatus*

criticus the traditionary exposition of their sacred books by the Pársís, as presented in their later versions and commentaries, we have exhausted the list of the aids at our command in the study of the Zendavesta.

In that invaluable repository of information on so many branches of Oriental literature, the *Journal of the German Oriental Society, (Zeitschrift der Deutschen Morgenländischen Gesellschaft,)* two papers have recently appeared, which are highly deserving of attention, as important contributions to our knowledge of the Zendavesta. One, by Dr. Friedrich Spiegel, is entitled "Studies on the Zendavesta"*; the other, entitled "The Legend of Feridun in India and Iran,"† is from the pen of Dr. Rudolph Roth, whose important treatise on the Literature and History of the Veda was formerly brought to the notice of the Society. (See Journal, vol. ii. p. 404.) The latter more especially demonstrates that light can be thrown on the Zendavesta by the Veda.

Dr. Spiegel's article is chiefly occupied with the consideration of the aid which Pársí tradition affords us in the investigation of the Zendavesta. He takes occasion to pronounce an opinion on the merits of the celebrated French version, by Anquetil du Perron. The work of Anquetil is so generally accessible, and so likely to be had recourse to as an easy means of information on the subject of Pársiism, that it is of importance for us to ponder the judgment which the German critic passes on its merits, lest we be led astray by deceptive lights. "The French version," says Spiegel, "was long held to be correct: it was believed that a closer investigation of the languages of the ancient books would be advantageous to philology, and might here and there modify the translation in details; but that substantially the conclusions of Anquetil would be confirmed. Contrary, however, to all expectation, recent investigation has completely set aside the results which we had deemed so certain, and has demonstrated that the whole inquiry must be commenced *de novo*. It is no longer a secret, that Anquetil's version is not trustworthy."

While employing this severe language, we must not forget—and Dr. Spiegel does not forget—that our obligations to Anquetil are exceedingly great. The zeal and unconquerable perseverance which he displayed in his search for the ancient Persian books are worthy of all admiration; and whatever may be thought of him as a philologist, he was at all

* Zeitschrift der Deutschen Morgenlandischen Gesellschaft, I. Band, III. and IV. Heft. p. 243.

† Ibid, II. Band, II. Heft. p. 216.

creats a great discoverer. Even had his version been a blunder from beginning to end, still the service he rendered in bringing the Zend writings from India to Europe, and directing the attention of Europe to them, would have entitled him to our gratitude and respect.

It has been usual, Dr. Spiegel remarks, to say that Anquetil was misled by trusting to the traditionary interpretation of the Zendavesta by the Párs'ís. Spiegel, however, doubts the correctness of this opinion. Since the Sanskrit version of portions of the Zend by Neriosengh is on the whole a close and correct rendering, it is scarcely credible that in the course of a few centuries so complete a revolution in the interpretation of their ancient books can have taken place among the Párs'ís, a people who cling with tenacity to what they believe to be their ancient creed, and who have been, since their arrival in India, subjected to no great national calamities.

Dr. Spiegel mentions that he is not acquainted with the modern Gujarátí versions of the Zendavesta. These will be referred to afterwards; but in the mean time we may remark that they confirm the opinion he has expressed. Most certainly Anquetil deviates widely from those versions that are at present accessible in Bombay; nor is it conceivable that in Surat, towards the end of last century, when he was there, the Párs'ís gave an interpretation of their sacred books nearly resembling that presented in Anquetil's work. Spiegel's opinion that Anquetil must have *guessed* the meaning from the Persian renderings which his Párs'í teacher supplied him of the Zend vocables, and must deliberately have tortured the stubborn terms till they appeared to yield some intelligible sense, is no doubt correct. Had Anquetil confessed his ignorance, (for he must have been aware of it,) he would have possessed a far stronger claim to our respect and gratitude than as the case now stands.

Spiegel's paper is mainly occupied with the tradition of the Párs'ís as contained in the Huzvaresh or Pehlivi version of the Zendavesta. In the entire absence of grammatical, and the almost entire absence of lexicographical, works on the Zend language, we are necessarily dependant on the translations that, happily, have come down to us; and pre-eminent among these is the oldest, or Pehlivi. From it, indeed, all later versions have been drawn. Of the date and character of the Pehlivi language a good deal is known from coins and inscriptions. It belongs to the era of the earlier Sassanian kings of Persia, [from A. D. 226 onwards,] and we may pretty safely refer the Pehlivi version of the Zendavesta to the same age. It is of high importance in the criticism of the Zend text. The fixing of a correct text is the first step

we must take in an investigation of all records. Comparing the Vedas with the Zendavesta, we can rely on the readings of the former much more confidently than those of the latter. The original Vedic text appears to have been wonderfully well secured by the various safeguards that were had recourse to; but the case is far otherwise with the Zendavesta. In particular, passages exist in the present Zend which do not appear in the Pehlivi version; and these are so embarrassing to the sense that they must be considered interpolations. As translated from a more ancient Zend text than that which now exists, the Pehlivi version is of high value in all questions of this nature.

Equally important is the Pehlivi version in the interpretation of the Zend. The Pehlivi is entirely a Persian dialect. A comparison of the Zend with the Sanskrit furnishes most important elucidations; but the connexion between Zend and Pehlivi is still closer, and, were the latter only as well understood as Sanskrit, it would be still more fruitful of results.

Spiegel illustrates at some length the utility of the Pehlivi version as throwing light on the state of the Persian religion in the time of the Sassanian kings. Wholly apart from its use as a translation, as a relic of the Sassanian dynasty it is possessed of much historical value. The Sassanian epoch is one of the highest importance in the history of Asia—and of Asiatic *mind;* but unhappily it is involved in much obscurity. The science of History may expect to receive interesting contributions from the light which will be shed on that epoch from the study of the Pehlivi version of the Zendavesta, and the works connected with it. At that period, Persia by no means secluded herself from intercourse with foreign nations. Greek and Christian influences acted powerfully on the Persian mind; and Pársiism, again, largely contributed to the opinions of the Gnostics and Manicheans. The western influence acted on Persia in two modes; the one, translations of Greek writers into Persian, the other, direct contact between the Persians and the Syrian Christians who were scattered in large numbers throughout the country.

The large number of Syriac words occurring in Pehlivi has long attracted attention; and Sir W. Jones expressed his "perfect conviction that Pehlevee was a dialect of Chaldaic." The usual explanation of this fact is that Pehlivi must have prevailed in the west of Persia, and there come in contact with the neighbouring Syriac; but the facts above noted have suggested an ingenious explanation to Spiegel of a different kind. He thinks that instead of personal, it may have been literary, intercourse between the Syrians and Persians that occasioned the similarity—the large circulation of Syriac books and ideas in Persia.

naturally leading to the transference of many words, just as the theological terms in modern Persian are to a large extent drawn from Arabic, the sacred language of Muhammadanism.

Dr. Spiegel's paper contains a brief notice of the history of the Pársí religion since the period of the Sassanian kings, which we pass over. He has two or three pages on the subject of *Pársí Eschatology*, which we hope afterwards to refer to. We shall doubtless soon see still further results from the labours of this very diligent investigator. In the mean time we proceed to notice the paper of Dr. Roth on *The Legend of Feridun in India and Iran.*

It has been well known for a considerable time that many of the technical religious terms occurring in the Veda are reproduced in the Zendavesta. Thus, the Vedic *Yajata*, meaning *worshipable*, is an epithet of the gods, and corresponds with the Zend *Yazata*, which denotes an *Izad*, or angel of the second class; the Vedic *soma* corresponds with the Zend *haoma*, the hom plant; the Vedic *deva* with the Zend *daêva*; and the first half of the Zend name of God, *Ahura Mazdâ*, (Hormazd,) apparently with the word *Asura*, which is frequently applied as a laudatory epithet to Vedic deities.* Thus, farther, *Vivanghvat* in Zend corresponds with the Sanskrit *Vivasvat*†; and the son of the former, *Yima*, with *Yama*, the son of the latter. The identification of proper names thus happily commenced by Bopp and Lassen has been carried out by Dr. Roth, in the case of the word *Feridun*.

The name of Feridun, the sixth king of the Peshdadian dynasty, is one of the most renowned in the whole compass of Persian history. The epic genius of Firdausi has found a congenial theme in the mighty achievements of "Feridun the Fortunate"; and later prose writers have delighted to hold him forth as a pattern of every virtue. Amid the confessedly inextricable confusion in which the primeval annals of Persia are involved, it has been fondly imagined that with him at all events we discern some traces of historic truth. The greatest exploit of Feridun was the overthrow of the tyrant Zohâk. Notwithstanding all the wild fables recorded of the latter,—such as that the devil kissed his shoulders, and made two fearful serpents spring from them, which required to be daily fed on human brains,—it has been customary to recognise in Zohâk the representative of a Western invasion, Arabian or Assyrian; and the thousand years during which he is said to have reigned have been held as the probable duration of the conquering

* Lassen's Indische Alterthumskunde, I. p. 522.
† Bopp's Nalus, 2nd Ed. p. 203. (1832.)

dynasty. Feridun is thus represented as the deliverer of Persia from a foreign yoke; and Sir John Malcolm is so far satisfied of the reality of his existence as to identify him with Arbaces the Mede, who is stated by Greek historians to have overturned the Assyrian monarchy under the effeminate Sardanapalus. There is a well-known passage of Firdausi to this effect:—

> "Feridun the fortunate was not an angel,
> Neither was he formed of musk and ambergris;
> He acquired his glory by justice and liberality:
> Be thou just and liberal, and thou shalt be a Feridun."

Now, if the conclusions of the German critic be accordant with truth, Feridun was certainly not formed of musk and ambergris, but he was composed of materials still less earthly and substantial: Feridun, in short, according to Roth, is no historic personage at all—he is simply one of the deities acknowledged in remote times by the Arian race; and, without any figure of speech, we may say that the battles which Firdausi celebrates with so much Homeric fire took place in the region of the clouds.

The investigation of this point by Roth is full and minute; but it will be sufficient to mention the more important particulars in the inquiry. The modern Persian word *Feridun* is derived from *Phréddna*, a softened form of the Zend *Thraêtôna*. In the Zendavesta he is said to have slain the destructive serpent with three throats, three tails, six eyes, and a thousand powers, which was created by Ahriman for the destruction of the world. This slaying of the serpent is in fact the sum and substance of the history of Thraêtôna in the Zend books. In the poetical narrative of the Shah Nameh the name of the tyrant whom Feridun slays is Zohâk; but Firdausi also writes the name اژدهاک *ash dahâk*, which is almost exactly the Zend *ashi dahâk*, i. e. *destructive serpent*. Thraêtôna is the son of *Athwya*, which in Persian is written *Athin*, or, as changed by Firdausi, *Abtin*.

Nearly the whole of this seems to occur in the Veda. In the Veda *Trita* occurs, or, as it is at least once written, *Traitana*, which closely resembles Thraêtôna. The Zend Thraêtôna is the son of Athwya; the patronymic of the Vedic Trita seems to be Aptya—an exact coincidence, the interchange of *t* and *p* being frequent between these languages. In Zend *Athwya* can hardly be etymologically significant; but the Sanskrit Aptya yields it a meaning, viz. "water-inhabiter," or "water-ruler."

But the resemblance goes beyond names—it extends to acts. Thraêtôna in the Zend books slays the "destructive serpent," and [illegible]

Ahi in the Veda. The serpent in the Zend books is a horrid monster, three-headed, three-tailed, and six-eyed: the Vedic serpent is very similar. We read thus in one of the Vedic hymns (x. 1, 8, 8):—

> "The Aptyá (*i. e.* Trita) knew his father's arms to wield;
> Sent (or, encouraged) by Indra, strode he to combat:
> The three-headed being, with seven tails, Trita slew,
> And the might of Twáshtri set the cattle free."

So far the resemblance is singularly exact. The champion, the enemy, the battle, are almost identical in the Veda and the Zendavesta. A difference exists between them as to the prize contended for.

In the Veda, Trita is a divine personage, who contends against the serpent for the rescue of the cows. We have here an edition of the old legend which occupies so prominent a place in the religion of the Veda, viz. that demons seize on the waters,—the many-tinted clouds, when, like cows going to pasture, they move across the sky,—carry them off captive, and bind them in fetters beyond the horizon; or, what is another form of the same thought, the malignant being who dwells in the mountains, locks up the springs in the dark recesses of his rocky caverns. Then it is that the thunderbolt of Indra (or, the arrow of Trita) cleaves the rocks, or rends asunder the dark mantle with which the demon has enveloped the sky, and then the imprisoned waters leap forth to liberty, and rush down to cheer and fertilize the earth. Such is the famous battle—one perpetually recurring in the Vedas; and such precisely is the battle between Trita and the serpent. Now in the Zendavesta the scene shifts; the battle is transferred from heaven to earth. The champion is the mortal son of a mortal sire; and the serpent he slays is a creation of the evil power, which is furnished with devilish might for the destruction of good in the world.

And then, lastly, comes the later Persian hero-legend, as presented in the great poem of Firdausi, the Sháh-Námeh. Here the attempt is made to draw the whole representation into the province of actual history. The battle is in Persia; the three-headed serpent is Zohâk, with a serpent springing up from each shoulder; he is seated on the usurped throne of Persia; his wickedness is the tyranny which he exercises ever his conquered subjects; and the blessing for which the noble Feridun contends is freedom to his country, and the restoration of its ancient royal line.

Dr. Roth thinks he finds some evidence of the fact that Trita—who certainly is not often mentioned in the Vedas, perhaps not oftener than thirty times—was a far more important person in the period anterior [illegible] reeting of the Vedic hymns than he afterwards became. His

similarity to Indra may have obscured his renown, as it certainly rendered his services of less importance. Apparently he was the ruler of the distant sky-waters, while Indra swayed over those in the visible heavens immediately around us. Trita is removed to the farthest point in space to which imagination can reach; thus in the prayer (viii. 6, 5, 13, &c.)—

> "Our sins, be they known, or be they secret, oh gods!
> Remove all far away from us to Trita the Aptya."

The supposition that the Vedic Trita, a divine being, is changed in the Zend and Persian books into a mortal hero of earthly mould, although rather startling at first sight, may be divested of all antecedent improbability by analogous facts that do not admit of question. One of the most renowned personages in the poem of Firdausi is Jamshid, the fourth king of the Peshdadian dynasty, whose romantic tale of love and sorrow is from first to last of the most earthly complexion. Yet it has been demonstrated to the satisfaction of Orientalists that the Jamshid of Firdausi, the Jam of other books, and the Yimo of the Zendavesta, are all one, and all identical with a deity in the Vedas, Yama. The king Jamshid of Firdausi appears in the Zendavesta as Yimo, a servant of Ahura Mazdâ, who ruled on earth during a golden age, in the earliest period of the world's history. On the contrary, in the Veda, Yama dwells in heaven as the ruler of the spirits of the departed, who banquet with him. (x. 1, 14, 10.) Thus it is said of him (ix. 7, 10, 7. 8):—

> "Where is the unextinguished light
> In the world, where the sunbeam dwells,
> Thither bring me, O Soma, into the immortal, inviolable world;
> Where the son of Vivasvat (Yama) ruleth as king,
> Where the steps up to heaven are,*
> Where those great waters dwell,
> There let me immortally be!"

Dr. Roth concludes his interesting inquiry with the following sentiments, the truth and importance of which will be generally admitted.

The time is now come to answer all questions as to the historic value of the accounts given by Firdausi and his innumerable followers respecting the early Persian kings; and we can do it by the assistance of the long-concealed but now disclosed legends of ancient India, [as contained in the Veda,] which must be connected with the statements of the Zendavesta. No confidence can be placed in the representations

* Roth, in a later paper, translates this "in the innermost of heaven."—*Zeitschrift*, IV. 427.

of Musulman writers. Not from works later than the Zendavesta, but from earlier ones, must light be obtained,—light, before which many figures which have been held as real flesh and blood will fade away like spectral illusions. But it is better to confess the void, and allow it to remain until we can gradually fill it with genuine forms, than view it through the delusive glimmer of a cloudy mythology. Instead of vainly toiling to extract historic truth from Firdausi's fascinating song, better far to make at once the humiliating admission that we are at this moment in total ignorance of the history of Persia as far down as the days of Cyrus.

II.

Since I last had the honour of bringing before the Society the chief facts connected with the recent progress of investigation in Zend literature, great advances have been made by some of the Continental Orientalists. I cannot attempt at present to comment on the labours of all who are doing good service in this important field of inquiry; I shall in a great degree confine this paper to a notice of the zealous and successful studies of two, whose names are already familiar to you—Professor Spiegel, of Erlangen, and Dr. Rudolph Roth.

Had time permitted, it would have been well to attend to the very useful work of Professor Brockhaus, who has given us an edition of the Zendavesta in Roman characters.* The index of this work is exceedingly useful; and the glossary is a valuable gift in the present state of Zend lexicography.

I have not yet seen the work on the first five chapters of the Vendidad that has been published within these few months by Lassen, but everything that comes from his pen must be of the highest value.†

Dr. R. Roth, whose interesting paper on the Legend of Feridun in India and Iran I have already brought to the notice of the Society, has continued the same style of investigation in an article on the Legend of Jamshid. (See *Zeitschrift der Deutschen Morgenländischen Gesell-*

* Vendidad Sade. Die Heiligen Schriften Zoroaster's: Yaçna, Vispered, und Vendidad. Nach den lithographirten Ausgaben von Paris und Bombay, mit Index und Glossar, herausgegeben von Dr. Hermann Brockhaus. (VENDIDAD SADE, *The Sacred Writings of Zoroaster: Yaçna, Visperad, and Vendidad. Edited after the lithographed editions of Paris and Bombay, with Index and Glossary. By Dr. H. Brockhaus.*)

† LASSEN (Christianus) Vendidadi Capita quinque priora.

schaft, IV. *Band*, s. 417.) Roth is not the discoverer of the identity of the Vedic *Yama*, and the Zend *Yimo*, or *Yimo Khshaêta*, i. e. *Yimo the Ruler*, or, as the designation is softened in the later Persian and Gujarátí, *Jamshid*. His paper is interesting, as fully unfolding the position which Yimo holds in the Zendavesta, and that of Yama in the Veda—positions very far from identical. In fact, amid the thousand fantastic metamorphoses to which mythological beings are subject in the lapse of centuries, we can scarcely discover a change more complete than that which the original Vedic deity Yama has been made to undergo. The word Yama, which it has been hitherto customary to translate *Tamer*, *Subduer*, Roth contends can only mean *Twin*, (from the same root as occurs in the Latin word *Geminus*, *Gemellus*). Yama is the twin-brother and Yamí the twin-sister; and Roth believes that these "twins" simply designate the first pair of the human race. But how deduce from this the general Vedic idea of Yama? The first man, says Roth, was the first stranger who found his way to the abode of the immortals, and the natural head of those who are destined, each in his order, to follow him thither,—Yama is the leader (prince) of beatified men. He dwells with the gods, and banquets with them. His dwelling is a place of joy—even of revelry.

In the Zendavesta, Yimo is the head of a golden age. In his kingdom there was "no frost, nor heat, nor darkness, nor death." We hear also much of a blessed region—a garden, or paradise—into which were collected chosen men, cattle, plants, &c. (See Vendidad, Fargard 2nd; Yaçna, Chap. 9th.)

He is also clearly pointed out in the Zendavesta as the receiver from Hormazd, and imparter to men, of a law or religion. Of the Bundeshne—a much later and most unsatisfactory work, abounding in things unintelligible and absurd—we need not say much; but it makes one statement of some importance, viz. that Jem (Yimo) had a wife, Jemê, or a sister, Jemakê. Connect this with what was said of the "twin-sister" Yamí.

In the great poem of Firdausi, and the innumerable works that draw from it as a store-house, Jamshid is a wise, magnificent, but finally erring and most unfortunate prince, who is expelled by Zohâk, and dies in exile.

But, lastly, the later Hindu idea of Yama is exceedingly unlike the Vedic one. Yama is still indeed the "king of justice—the ruler of the Pitris," or ancestors*; but he is also the king of hell. "These, and

* See Vishnu Purána, (Wilson's,) p. 152.

other fearful hells, are the awful provinces of the kingdom of Yama, terrible with instruments of torture, and with fire."*

Such are the magic transformations of mythology! In the books of the one country (Persia), we see the blessed and honoured ruler of a golden age, in whose kingdom evil and death are unknown, changed into a fugitive and miserable prince, who dies by violence; in those of the other (India), the prince of the blessed dead in heaven, in whose realm only pleasure and rapture have place, is metamorphosed into the gloomy and relentless judge of the dead. And all of these four conceptions are as widely as possible removed from the fundamental idea out of which the whole has arisen, viz. that of Yama as the great ancestor of the human race.

Should this identification of Yama and Yimo be permanently retained, (and, startling as the divergencies become, there is little doubt that the connexion traced by Dr. Roth is correct,) it is worth while to note that the conception of Yimo in the Zendavesta and later Persian books remains truer to the original idea than that which is presented in the Vedas. Yimo, the ruler of a blessed period; the teacher—himself divinely taught—of men; the inhabitant of a blessed region or paradise on earth,—this description of *the first man* is singularly like that contained in Genesis, and would seem no indistinct echo of the inspired record. Various questions of course immediately suggest themselves as to the age of the Zendavesta, and the purity of the text, before we can base any very positive conclusions on this coincidence; but the point is eminently worthy of investigation. The further striking coincidences with the record in Genesis which the poem of Firdausi supplies cannot be urged as of very much importance, inasmuch as Biblical ideas, derived from the Korán, mingle themselves to a large extent with all the representations of early Persian history by Persian Musulmans.†

The Orientalist, however, who has during the last three or four years communicated to the public the largest amount of new information, is Dr. F. Spiegel, of Erlangen, whose name is already familiar to this Society. His contributions are numerous and valuable.

In the *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, III. *Band*, s. 216, we have an article from his pen on "The Legend of

* See Vishnu Purána, (Wilson's,) p. 207.

† The name *Jamshid* is still in frequent use among the Párs'is. We have it in the first part of the name of our worthy Párs'i Knight, which is, in Jonesian orthography, *Jamshid-ji*. We have also in Bombay a newspaper called the *Jám-i-Jamshid*, the *Cup*, or rather *Mirror, of Jamshid*.

With respect to the popular conception now prevalent in India regarding Yama,

Sám."* This we may pass over as not very important in its bearing on Zend literature. Sám is the first of a line of heroes—Sám, Zál, Rustam,—who are highly renowned in early Persian history. The conclusion to which Spiegel comes is that the whole account of Sám is unhistorical—a purely poetic fiction. He thus adds another proof to the assertion that the record of the Peshdadian period of the Persian annals, in which the genius of Firdausi so luxuriates, is simply wild mythology.

Directly connected with the Zendavesta, there are several important papers of Dr. Spiegel's. Various articles of his, published in the Transactions of the Royal Bavarian Academy of Sciences, treat of the manuscripts of the Vendidad, and the purity of the text. We omit the consideration of these at present; when Spiegel gives us a collection of various readings in the edition of the Zendavesta which he is now happily carrying through the press, he will doubtless supply us with his matured conclusions as to the state of the Zend text.

He has published a separate paper on "Some Interpolated Passages in the Vendidad." He applies the Pehlivi version to the Zend, and finds numerous passages, some of them important, in which the Zend readings have nothing corresponding to them in the translation. These

the following *abhang*, or Maráthí ode, will suffice. The translation is literal—the abruptness of expression being retained from the original:—

> "Worldly joy here seemeth sweet;
> Afterwards, hard are the pains of Yama.!
> They strike, they cut, terribly they slash,
> The servants of Yama, for many years.
> The tree with sword-shaped leaves—fire of Khair—
> Flames of burning oil burst forth.
> They make them walk over burning ground;
> Pillars of fire with their arms they clasp.
> Therefore is Tuká full of pitying sorrow—
> Enough of coming and going, and being born!"

How infinitely unlike the realm of Yama, as pictured in these terrible words, from the region where, "in the innermost of heaven," the Vedic Yama banquets with the divinities! The transformation, as a historical fact, has been skilfully traced by Roth. Equally interesting, however, would be an inquiry into the causes that produced the change. I do not know that the investigation would raise our estimate of the Veda, morally considered. Its allusions to the unseen world of the departed—to immortality and future blessedness, are exceedingly few. Allusions to future punishment, in consequence of sin in this life—are there any such? If not, it seems to me that the conception of hell, even when so gross as the horrible representations of the Puránas of the later Hindus, the Ardai-Viraf-Nameh of the Pársís, and the Korán of the Musulmans, exhibits a higher condition of the moral consciousness than we can trace in the Veda.

* *Die Sage von Sâm, und das Sâm-nâme.*

seems interpolated. He has also published a treatise, containing the Zend text of the 19th Fargard of the Vendidad in Roman characters, a translation, and copious notes, critical and explanatory. This is an important part of the Zendavesta, and Spiegel's annotations touch on some weighty questions. One of these is the Pársí doctrine respecting *Zaruána Akarana*. The question has often been discussed whether the Pársís recognize a being called Zaruán Akaran as the supreme divinity, or whether Ahura Mazdá, the good principle, is so. In the treatise now under review, Spiegel strongly contends against the personality of Zaruán Akaran. The Zend words occurring in the 33rd section—*Dathat çpĕnto mainyus dathat Zrvâné Akarane*, are highly important in the decision of this question, as on them mainly has been based the view which Spiegel combats. Anquetil renders the passage thus :—"L'être absorbé dans l'excellence t'a donné, le tems sans bornes t'a donné"—that is : "The being absorbed in excellence has given thee ; time without bounds has given thee." Spiegel, on the other hand, thus translates : Cpĕnto-Mainyus (*i. e.* Ahura Mazdá) created it ; he created it in endless time." In a note on the passage he says that Anquetil's version, with all the consequences which he and others have deduced from it, is certainly false ; and that the opinion that endless time is in the Zendavesta exalted over Hormazd is thus left entirely without support. The views of Spiegel on this question agree with those of Müller, Brockhaus, and Roth ; and it is interesting in this connexion to observe that our modern Pársís in India coincide with them. They have been attacked, however, by Schlottman, in an article in Weber's *Indische Studien*,* and in a commentary on the Book of Job. The latter work I have not seen, but the paper in the *Indische Studien* is now before me. The writer conceives that Zaruán Akarau corresponds with the Semitic Χρόνος—a deity found under various names among the ancient Babylonians, Phœnicians, and Arabians. Zaruan answers, according to Schlottman, to the Βῆλος ἀρχαῖος, Ahura Mazdá to the Βῆλος δεύτερος.† These two, he conceives, are not necessarily different : the first and second Bel are in certain cases identified, and, in like manner, Ahura Mazdá, considered as the absolute, the eternal, is Zaruán Akaran. Spiegel has written a

* Heft I. s. 364.

† This signification of the word Akaran has occasioned a good deal of discussion. Spiegel accedes to the translation of Anquetil, *without bounds*, which corresponds with the Pehlivi rendering, and is the prevalent one among the Pársís now. The objection to this rendering is that the word *kanár (boundary)* is not known in Zend. Roth, Brockhaus, and others, prefer the rendering *causeless, uncreated.*

full reply to the criticism by Schlottman.* He contends, with Mohl, that in the proper Pársí system there is no place for Zaruán as the supreme deity, and that the dualism of the Pársís is not absolute, a superiority being still retained by Ahura Mazdá. This conception of Zaruán, then, must be later than the original system; and the testimonies of later Greek and Armenian writers on the point, however true regarding the Pársí system prevalent in their own day, do not apply to its earlier form. The existence at a later period of the idea of Zaruán as deified fate or destiny, Spiegel admits, as also the resemblance between this conception and the Babylonian one. The question then arises—Did the Pársís obtain the conception from their Babylonian neighbours? Possibly so; but we cannot pronounce positively,—the conception may have occurred spontaneously to the Pársís. So Spiegel; but, considering the close connexion between the Pársís and their neighbours on the west,—the Assyrians and Babylonians,—and considering the abundant evidence of the religious influence exerted by the latter two nations on the first, supplied by the recent discoveries of Layard and others, we can hardly hesitate to pronounce the notion of Zaruán not original, but borrowed from Mesopotamia.†

Another point of great importance in the interpretation of the Zendavesta is the doctrine of the resurrection. The doctrine of the resurrection of the body is the general belief of the modern Pársís, unless, perhaps, where, in country districts, their intercourse with Hindus has shaken their confidence in a tenet so much opposed to the prevalent Indian notion. We find the doctrine, also, in the Pársí later books, from the Bundeshne downwards. Anquetil thought he saw it also distinctly enunciated in the Zend books; and on his authority it was for a long time considered an integral portion of the Zoroastrian theology. A polemical use was eagerly made of the supposed fact by various Neologian critics; for example Gesenius, in his commentary on Isaiah xxvi. 9,‡ boldly asserts that the Jews adopted the dogma of the

* Zeitschrift der D. M. G. V. 221.

† A very difficult word, which is generally connected with Zaruán Akaran, viz. *vayi*, is rendered by Anquetil, although with some hesitation, (See on Vendidad, Farg. xix. p. 415, note,) *oiseau*, or *bird*, but is translated by Spiegel *sky*. Schlottman very pertinently refers to the winged figure in a circle that is often seen suspended over the head of the king in Assyrian and Persian monuments. Anquetil's "bird acting on high" certainly bears a remarkable resemblance to this symbol of deity.

‡ "Thy dead men shall live; together with my dead body shall they arise. Awake and sing, ye that dwell in the dust; for thy dew is as the dew of herbs; and the earth shall cast out the dead."—*Authorised English Translation.*

resurrection from the Zoroastrian theology.* M. Burnouf in 1840, in the pages of the *Journal Asiatique*, has discussed with great fulness and precision the meaning of the terms *yavaëcha yavatataëcha*, which Anquetil renders *until the resurrection*, and has proved that they have no such signification, but simply mean *for ever*. Spiegel, in his critical examination of the 19th Fargard of the Vendidad, has occasion to discuss nearly all the terms in which Anquetil finds the doctrine of the resurrection; and the conclusion at which he arrives is in accordance with that of Burnouf. Except for the testimony which Theopompos *perhaps* bears as to its existence, and the occurrence of certain Zend quotations which Spiegel finds in the Bundeshne which seem to bear on the subject, and which at least deserve investigation, we might safely enough assert that the doctrine of the resurrection was unknown before the Sassanian era.†

Spiegel unhappily does not quote the words of Theopompos, but refers to Plutarch, *De Iside et Osiride*, Chap. 47. The edition of Plutarch to which I have access is that of Reiske, (Lipsiæ, 1777,) which does not divide the treatise into chapters. I have carefully searched for the sentiments which Spiegel refers to, but in vain. Theopompos is quoted more than once; but the nearest approximation to the sentiment attributed to him which I can find is the following. Speaking of the final defeat of Ahriman, Ἀρειμάνιος or Ἄιδης, he says it is the opinion of the Magi τοὺς μὲν ἀνθρώπους εὐδαίμονας ἔσεσθαι μήτε τροφῆς δεομένους, μήτε σκιὰν ποιοῦντας—*i. e.* "Men will then be happy, neither requiring food, nor making a shadow." This has nothing to do with the doctrine of a resurrection.

Immediately preceding the quotation from Theopompos, Plutarch says that when Areimanios is destroyed it is believed "the earth will be plain and level, one mode of life and government will prevail, and men will be blessed, and all speak one language." This too is as wide as possible of the doctrine.

With regard to Zend quotations on the subject in the Bundeshne, we shall be happy to see Spiegel's comments upon them; but unless they

* "Die Juden dieses dogma aus der Zoroastrischen theologie anfnahmen, und an ihre Messianischen vorstellungen anwanden, wofür unsere stelle classisch ist."

† The important term *hakhshâné*, in the 19th Fargard, Sect. 86, which Anquetil renders *resusciter*, or *rise again*, Spiegel renders *auffordern*, or *call forth, summon*.—Theopompos was a contemporary of Alexander the Great. Should his evidence seem to prove the doctrine of the resurrection to have prevailed among the Pársis in his time, we might infer that probably they obtained it from the Jews in the sixth century B. C. But we shall hope to have a full examination of this important matter from Spiegel or some other Continental scholar before long.

can be referred to the Zendavesta proper, their appearance in such a *farrago* as the Bundeshne will prove little or nothing on the point in question. So far as evidence is at present available, the probability is exceedingly strong that the doctrine of the resurrection is of comparatively recent introduction into the Zoroastrian system.

I may take this opportunity of expressing my conviction that our Orientalists are not in general disposed to attribute so much influence to Judaism in the development of the Pársí system as the historical connexion between the Jews and Persians suggests as probable, and even necessary. The wide dissemination of Jews and Jewish opinions throughout the Roman Empire is an admitted fact, and in reference to their influence on the Roman mind Seneca uses the strong language *victoribus victi leges dederunt.** We have no reason to believe the influence of Judaism in Persia to have been less. Of its powerful action on the mind of Arabia I need not speak.

Another paper from the pen of Spiegel, entitled "The Second Part of the Yaçna, a Contribution to the History of the Text of the Zendavesta,"† is exceedingly interesting, as a vigorous attempt to form some judgment regarding the relative antiquity of the chief portions of the Zend books. As yet we are wholly at a loss to fix anything like a date connected with the Zendavesta. Shall we refer it bodily, with the Pársís, to the age of the mythical Gushtasp? Shall we, with some who still adhere to Vans Kennedy's opinion, make out the whole to be an impudent forgery, committed since the overthrow of the Persian kingdom by the Muhammadans? Or shall we refer the compilation of the Zendavesta to the Sassanian epoch? And, in that case, may not fragments at least of books, composed some centuries earlier, have found a place in the collection? Such questions may be asked, but no satisfactory reply has as yet been possible. In the paper we now refer to, Spiegel mentions that several years ago he pointed out the fact that in the Yaçna we have two distinct dialects, which must be referred to two different ages, or else localities. This opinion has been confirmed by his more recent studies, and the paper now before us gives us the grounds of his belief. We cannot in these pages enter into the grammatical details which he investigates, but the general summary with which he concludes his paper will be read with interest:—

"We are now prepared to attempt an arrangement of the different portions of the Zendavesta in the order of their antiquity. First, we place the second part of the Yaçna, as separated in respect to the

* De Superstitione.

† Indische Studien, I. 393.

language of the Zendavesta, yet not composed by Zoroaster himself, since he is named in the third person; and indeed everything intimates that neither he nor his disciple Gushtasp was alive. The second place must unquestionably be assigned to the Vendidad. I do not believe that the book was originally composed as it now stands,—it has suffered both earlier and later interpolations; still, its present form may be traced to a considerable antiquity. The antiquity of the work is proved by its contents, which distinctly show that the sacred literature was not yet completed.

"The case is different with the writings of the last period, among which I reckon the first part of the Yaçna, and the whole of the Yeshts. Among these a theological character is unmistakeable, the separate divinities having their attributes and titles dogmatically fixed.

"Altogether, it is interesting to trace the progress of religion in these Pársí writings. It is a significant fact that in the oldest, that is to say the second part of the Yaçna, nothing is fixed in the doctrine regarding God. In the writings of the second period, that is in the Vendidad, we trace the advance to a theological, and, in its way, mild and scientific system. Out of this, in the last place, there springs the stern and intolerant religion of the Sassanian epoch.

"Closely related to the Persian system in its origin, yet how totally different in its development, has been the religious system of India! While the Pársís learned to venerate every syllable of their sacred books, we find in India, as soon as theological exposition commenced, an allegorizing spirit busily at work, to fashion anew the old materials which were no longer in accordance with the spirit of the age. Thus, in the course of generations, we find that the old nature-worship of the Vedas has been succeeded by a fantastic system, so utterly unlike the earlier that no one, looking at the later development, could possibly have conjectured the original form."

Another important work of Spiegel's is a "Grammar of the Parsi Language."* By the term *Parsi* language Spiegel denotes a dialect that has not hitherto received a name—one intermediate between the Huzvaresh or proper Pehlivi, and the modern Persian. We pass over all grammatical minutiæ, and attend to some general characteristics of the language. In an introduction of fifteen pages, our author enters into a discussion of the term *Pá-zend*, which leads to some useful results. There has been considerable doubt as to the real meaning of this frequently-recurring term—some denoting by it a book, others a language.

* Grammatik der Parsi Sprache, nebst Sprachproben von Dr. F. Spiegel. Leipzig: 1851.

That Pá-zend was the name of a book was the view of Hyde, the English scholar who first successfully cultivated the study of the ancient Persian religion. He adopted this opinion from the Arabic and Persian writers with whom he was familiar,—such being the uniform testimony of the Persian lexicon the Burhán-i-Qáti, and other eastern authorities. On the other hand, Anquetil, in his great work, and a special treatise on the language of ancient Persia, denominates the oldest language of Persia, and the language of the ancient sacred books, as Zend. He knew that the term was used by the Pársís themselves, and various eastern writers, to designate a book; but this he conceived to be an error. Anquetil, says Spiegel, is mistaken. Recent investigators, such as Burnouf and Müller, hold that the terms Zend and Pá-zend denote books, not languages. Burnouf remarks that the term Zend does not occur in the Zend text. He understands it to be derived from *zantu*, a town, and properly to signify the book of the people, or of the towns,—a sense which he compares with the Indian name, *devanágarí*, of the Sanskrit character.

Spiegel is convinced that by the term *Avesta* are properly understood the sacred writings; by *Zend* the commentary, or rather the translation of this; and by the term *Pá-zend* the glosses or annotations on the translation. The signification of Avesta is, as shown by Müller in his essay on the Pehlivi, *text*. Spiegel has no etymology of the term Zend which satisfies himself. The Sanskrit seems to afford little aid; and, as the word is of comparatively later origin, he deems it possible that some of the Semitic tongues may yet supply the desideratum.

It may be doubted if the opinion expressed by Spiegel regarding the meaning of the terms Zend and Pá zend will stand. The usage of our modern Pársís is rather conflicting, and, perhaps, not much can be based upon it. They certainly often apply the term Zend to the language of their sacred books; but the more learned among them apply it primarily to the *character* or *writing* of the sacred books, and hence, secondarily, to the language. By Pá-zend the Pársís seem to understand the *translation* of the sacred text, which is generally interlinear.

In the Zendavesta, or, as Spiegel would call it, the Avesta, there are three languages: 1st, the so-called Zend; 2nd, the Huzvaresh,* or proper Pehlivi; and, 3rd, the language hitherto unnamed, which Spiegel now analyses, and denominates Parsi. In the last language are composed various translations and independent pieces,—the Aferins, the Patets, the translation of Minokhired, &c. This dialect is intermediate

* Huzvaresh, *i. e.* Huzaothna, *bonum sacrificium*.

between the Pehlivi of the Sassanian epoch and modern Persian, but with nearer relationship to the latter. We may, with probability, refer it to the time that intervened between the conquest of Persia by the Arabs, and the birth of Firdausi. It has been noted that Firdausi writes in the Deri dialect of Persia; and between the Deri and the "Parsi" of Spiegel there is considerable resemblance. Mohl would refer it to the eastern parts of Persia.

But the most important of all Spiegel's labours in Zend literature is his edition of the Zendavesta which is now passing through the press.* The first part, containing, in 112 pages, ten fargards of the Vendidad, is now before me: it is most beautifully got up,—paper and printing do great credit to the Imperial Press of Vienna, from which the work is issued. The original text is to be followed by the Huzvaresh (Pehlivi) translation, a copious list of various readings, and a German translation.

We shall be laid under the deepest obligations both to this zealous scholar, and to our learned friend Mr. Westergaard, of Copenhagen, who is also busy engaged in carrying an edition of the Zendavesta through the press, accompanied by what will be a great recommendation to it among our Indian Pársís, an *English* translation. The simultaneous appearance of two translations will be an advantage. So dark a work as the Zendavesta cannot be fully elucidated by the labours of one investigator, however learned and laborious; and the Danish and German critics will profitably be studied together.

Reference has been more than once made in the above pages to the modern Gujarátí translations of the Zendavesta. By far the best known of these is that of Frámjí Aspandiárjí, an edition of which was lithographed by our Society in 1842 and 1843, and copies distributed to the chief colleges and learned societies of Europe. It may be an interesting thing to compare the versions of the 19th Fargard of the Vendidad as given by Anquetil, Spiegel, and Frámjí. I shall here subjoin literal English renderings of the three versions. In translating Frámjí's almost untranslatable Gujarátí, I have had the kind assistance of my learned friend Mr. Dhanjíbhai Frámjí, whose unwearied labours in Zend and Pehlivi literature are well known to the Society, and whose forthcoming work we hail as an important contribution to the elucidation of the subject.

* Avesta; die Heiligen Schriften der Parsen. Zum ersten Male im Grundtexte sammt der Huzvaresch uebersetzung herausgegeben von Dr. Friedrich Spiegel, &c. Leipzig: 1851. (*Avesta, the Sacred Writings of the Parsis. Now first edited in the original text, with the Huzvaresh version, by Dr Frederick Spiegel, &c.* Leipzig: 1851.)

I.—*Spiegel's Translation of part of the 19th Fargard of the Vendidad.*

1. From the northern region, from the northern regions, rushed Agra Mainyus, he who is full of death, the Daeva of the Daevas.
2. Thus spoke this malevolent Agra Mainyus, who is full of death:
3. Drukhs! run, kill the holy Zoroaster.
4. The Drukhs ran round him, the Daeva Buiti, the perishable, the deceiver of mortals.
5. Zoroaster pronounced the prayer Ahuna-vairya, *Yatha ahu vairyo*, &c. May they praise the good waters of the good creation, and honour the Mazdayaçnian law.
6. The Drukhs ran troubled from him, the Daeva Buiti, the perishable, the deceiver of mortals.
7. The Drukhs answered him, [Ahriman,] Tormenting Ahriman!
8. I see not death on him, on the holy Zoroaster.
9. Full of splendour is the holy Zoroaster.
10. Zoroaster saw in spirit: the bad malevolent Daevas consult about my death.
11. Zoroaster raised himself, Zoroaster advanced;
12. Not injured by Aka-mano's very tormenting questions.
13. Holding darts in his hand—which are of the size of a Kata—the holy Zoroaster;
14. Which he had received from the Creator, Ahura Mazdá.
15. To hold them on this earth, the wide, round, difficultly-traversed [earth], in great strength, in the dwelling of Pourushaçpa.
16. Zoroaster addressed Agra Mainyus: Malevolent Agra Mainyus!
17. I will slay the creation which has been made by the Daevas; I will slay the Naçus whom the Daevas have made;
18. I will slay the Paris to whom they pray (?) until Caoshyanç [viz. the useful] shall be born, the victorious, out of the water Kançaoya.
19. From the eastern region, from the eastern regions,
20. Him answered Agra Mainyus, who has made evil productions:
21. Kill not my productions, oh! holy Zoroaster!
22. Thou art the son of Pourushaçpa, and hast life from a [mortal] mother.
23. Curse the good Mazdayaçnian law, acquire happiness, as Vadhaghna, the ruler of the regions, acquired it.
24. To him rejoined the holy Zoroaster:
25. I will not curse the good Mazdayaçnian law—
26. Not though bones, soul, and means of life shall be separated from each other.
27. To him rejoined Agra Mainyus, who has made bad productions:
28. Through whose word wilt thou slay; through whose word wilt thou destroy; through whose good weapons, against the productions of me, Agra Mainyus?
29. To him rejoined the holy Zoroaster:
30. Mortar, shells, homa, and the words which Ahura Mazdá has spoken—
31. These are my best weapons;
32. Through this word will I slay; through this word will I destroy; through these weapons are we victorious, oh! wicked Agra Mainyus!

33. Cpento Mainyus created it; he created in endless time.
34. The Amesha-spenta created it, the good rulers, the wise.

II.—*Frámjí Aspandiárjí's Translation.*

1. From the northern quarter, the northern quarter, ran fast the wicked Mino, full of death, Dev of Devs.
2. Thus said the malevolent, the wicked Mino, full of death: Daruj!
3. Run quickly to injure the holy Zoroaster.
4. The Daruj ran upon him, named But Dev, death, he who walks in secret, the deceiver.
5. Zoroaster loudly prayed the Ahunavar, the pure water was much praised of the Vehedácti, [according to] the Masdiasnian religion, Faruáráne.
6. The Daruj, distressed, ran away back, the Dev But, of death, he who walks in secret, the deceiver.
7. The Daruj replied to the destroyer, the wicked Mino:
8. Not upon that death do I see Sapetmán Zoroaster.
9. Full of light is holy the Zoroaster.
10. Zoroaster saw in his mind that the Dev, the infidel and malevolent, was asking for his death.
11. Zoroaster stood up—Zoroaster moved forward,
12. To distress the Akuman [by] hard questions.
13. The holy Zoroaster, holding in his hand the excellent [instrument], namely the Noghere,* was in the house;
14. Received from Dádár Hormazd.
15. That [*quaere*, by which?] he kept the earth [under his] protection, far away [from the Dev] hard, hard gold,† in the house of Pouroshasp.
16. Zoroaster quickly rose‡ [on] the wicked Mino, the malevolent, wicked Mino:
17. Let me kill the creation of the Dev, given, let me kill Nasas, given by the Dev;
18. Let me kill the worshippers of the Paris, for [they are] idolaters, for soon will be born the beneficial, the successful, from the water Keáns.§
19. From the eastern quarter, from the eastern quarter,
20. Replied the malevolent, wicked Mino:

* A stick with nine knots.

† This seems nonsense. The commentary slurs over the difficulty, and says nothing of *gold*.

‡ This sense is so much out of place, that perhaps there is an error of transcription.

§ "Let me kill the respecters of the Paris, and the idolater, that is, the worshipper of images, and let my disciples also kill you, and afterwards the victorious and beneficial will arrive from the river Kánse: he too will kill you, that is my sons Hoshedar, and Hoshedarmaha, and Sosioesh. These three sons will be born from the river Kánse, and they shall kill you for your own deeds, they shall kill you for your actions."

The above is Frámji's commentary on Sects. 18, 19. The passage is important, as connected with Párs' eschatology. The foolish and disgusting tale told in the later books regarding the three sons of Zoroaster who are still unborn will be seen in Anquetil's Zendavesta, Tom. I. Part 2, p. 46; and Tom. II. p. 420. Frámjí evidently refers to it in the above comment; but his literal version is pretty correct. Anquetil's version (see below) is a commentary, not a translation.

21. Do not kill my creatures, holy Zoroaster.
22. Thou art son born from Pouroshasp.
23. Abandon the excellent Masdiasnian religion, and attain virtue, like Zohàk, the king.
24. Said to him in reply Sapetmán Zoroaster:
25. I will not abandon the excellent Masdiasnian religion;
26. Not while I have body, and soul, and life, will I turn (apostatize).
27. Said to him in reply the malevolent, wicked Mino:
28. By what word wilt thou destroy; by what word wilt thou remove; by what excellent instrument [wilt thou destroy] the creation of me, wicked Mino?
29. Replied to him Sapetmán Zoroaster:
30. By havanim, tasto,* haom, and the word spoken by Hormazd.
31. My instrument is excellent, (high).
32. (By) this word I will throw off, by this word I will force [you] to retire, by this instrument made holy, oh! malevolent, wicked Mino!
33. Given by Sapena Mino; given by† boundless time, (Zamána Akanár).
34. Given by the excellent Amshaspands, pure masters, givers of purity.

III.—*Anquetil's Translation.*

1. It is from the north quarter, various places which are to the north, that Ahriman, full of death, that chief of the Dews, runs.
2. He runs continually, that Ahriman, full of death, master of the bad law.
3. That Daruj runs over the world, and ravages it, oh! pure Zoroaster!
4. That Daruj goes everywhere: it is he that is the Dew, author of evils, who ravages, torments, and teaches the bad law.
5. (In the commencement) I pronounced the Honover, oh! Zoroaster (saying): It is the desire of Ormusd, &c. I made izeshne to the pure water, which has been given pure: I practised the law of the Mazdeiesnans.
6. That Daruj, enfeebled and without force, *(sans forces,)* returned behind, he who is the Dew, author of evils, who ravages, and teaches the bad law.
7, 8. That Daruj, that proud Ahriman, wished to answer me.
9. He had not seen, oh! Sapetmán Zoroaster, the holy Zoroaster full of glory.
10. That infernal Dew, author of the bad law, saw in thought Zoroaster, and was annihilated by it.
11, 12. (He saw) that Zoroaster would have the superiority, and would march with a victorious pace; he saw that cruel Akuman, the source of evils, would be destroyed.
13. He who has long arms, and an extended body, oh! holy Zoroaster!
14. Without having regard to the great Ormusd, the just judge,
15. (Traversed) the extended earth, ran over its length and breadth, and after having passed (like) a bridge which extends far along, he went into the strong place which Poroshasp (inhabited).
16. Zoroaster was stronger than Ahriman, that Ahriman, author of the bad law.
17. He struck the people given by that Dew, he struck (the Daruj) Nesosh, given by that Dew.

* Figures of these sacrificial vessels will be found in Anquetil's Zendavesta, Tom. II. p. 533; and the Rev. Dr. Wilson's "Pársí Religion," p. 231.

† In his translation Frámji makes the *to*, in his commentary *by*.

18. The Paris and their designs shall be destroyed by him who will spring from the fountain, by Sosiocsh the conqueror, (who will arise) from the water Kansé.
19. By Osheder (bami), and by Osheder (mah), who (will come) from the quarter (where is the water Kansé).
20. Then Ahriman, master of the bad law, said:
21. Destroy not my people, oh! pure Zoroaster!
22. You, son of Poroshasp, who art born of her who has borne you.
23. The pure law of the Mazdeiesnans shall be practised (in the world) when the pure chief of the provinces shall appear.
24. I answered him, oh! Sapetmán Zoroaster:
25. If thou do not embrace the pure law of the Mazdeiesnans,
26. The bones, the soul, the members (of thy productions) shall not grow again.
27. Ahriman, that master of the bad law, said to me on that:
28. What is that word which is to give life to my people, which is to increase it, if I regard it with respect, if I make vows with that word?
29. I answered him, oh! Sapetmán Zoroaster:
30. Pronounce the word of Ormusd, with the hàvan, with the salvers, and with the hom.
31. It is I who (by that word) augment Behesht.
32. It is in regarding that word with respect, in making vows with that word, that thou shalt have life and happiness, Ahriman, master of the bad law.
33. The being absorbed in excellence has given thee, time without bounds has given thee.
34. He has also given with greatness the Amshaspands, who are pure productions and holy kings.

It will be seen, from a comparison of the above three versions, that the German Professor and the Pársí Dastur, on the whole, well agree with each other, while the French rendering deviates so widely from both, as seldom to present the same sense as theirs throughout a single sentence. The explanation of the coincidence between Spiegel and Frámjí is that both are nearly correct in their understanding of the Zend, and both attach much importance to the Pehlivi version. Anquetil's deviations, on the other hand, are as inexplicable as they are capricious.

These remarks are lengthening out more than I desired, and I shall say less than I once intended on our modern Pársí versions.

1. The one of greatest importance is that of Frámjí Aspandiárjí. In the preface to the work it is mentioned that it was compiled at the request of the late Frámjí Cawasjí, Esq., a man whose name stands honourably distinguished among the Párśis both for philanthropy and enlightenment. The translation was commenced in 1823, and finished in 1825. The translator followed chiefly the Pehlivi version. The work contains the Zend text written in Gujarátí characters, an interlinear literal version into Gujaratí, and a freer rendering, more a com-

mentary than a version. When it was finished it was submitted for revision to four learned Pársí Dasturs, viz. Mulla Firuz, (the well-known Editor of the *Desatir*, and a man highly complimented by Sir John Malcolm,) Edaljí Dárábjí Sanjána, Jamshidjí Edaljí, and Jámásjí Edaljí. Meetings were held by three of the Dasturs now mentioned, for the purpose of examining the work—Edaljí Dárábjí for some cause or other absenting himself. The translation was revised, and, when approved, manuscript copies were made, and to some small extent circulated in the Pársí community.

Disputes connected with the calculation of time have run high among the Párs'is; and although Frámjí Aspandiárjí personally belonged to the Rasamí party, his patron was the leader of the other; and for this reason, as many Párs'is say, his work has been violently attacked by one party. When a proposal was recently submitted to our Society at the request of Dr. Graul, of Leipsic, in which Dr. Brockhaus (of whose valuable labours in Zend investigation we have spoken above) was understood to concur, that Frámjí's version should be rendered into English, strong remonstrances were made by some of the Pársí community against the translating of "an erroneous book." Unhappily, while declaiming against its errors, they have substituted nothing better in its place.

2. It was indeed asserted that a translation of the Zendavesta had been made by Edaljí Dárábjí Sanjána. A manuscript copy of this was actually exhibited to the Society, which contained four fargards of the Vendidad, the whole very carefully written out, and containing the Zend original in its own character, the Pehlivi version in its character, and a Gujarátí version, with occasional notes. If the entire Zendavesta, or even the entire Vendidad, has been completed in the same style, the work would be most valuable; and the Pársí Panchayet, to whom it is understood to belong, certainly owe it to their own character to render the book accessible. Why should not some Pársí *millionaire* publish an edition of it?

3. Edaljí Dárábjí Sanjána published in 1811 an edition of the Khurdah Avesta, the Zend in Gujarátí characters, and accompanied by a Gujarátí version, 12mo. pp. 799. A second edition of this work, enlarged, 8vo. pp. 338, appeared in 1845.

4. The Herbad Edaljí Dastur Dárábjí Asájí published in 1833 the Avá Yast, Zend in Gujarátí characters, with a Gujarátí version, 8vo. pp. 234.

5. Aspandiárjí Frámjí, the son of Frámjí Aspandiárjí, published

in 1849 an edition of the Yaçna, Zend in Gujarátí characters, with a Gujarátí version, quarto, pp. 383.

We shall, however, soon have the pleasure of receiving the English translation of Professor Westergaard, and the German one by Professor Spiegel; and the cause of Oriental investigation will not greatly suffer even though the labours of such learned men as Edaljí Dárábjí should by a most mistaken policy continue to be withheld from the public. The mystic oracle, long silent, will soon be vocal, and even intelligible. Should such men as Westergaard and Spiegel read these lines, they will accept of our thanks for the great work they are performing. Their labours have a far higher than an antiquarian, a philological, or a philosophic value. In the present condition of the Pársí community they will exert a practical influence of a most important character; they will powerfully tend to recall to consciousness the slumbering mind of an interesting race,—the remnant of a once mighty and influential people,—lead them to reflection on the most momentous and arousing of all questions, and thus co-operate with still higher agencies in giving freedom to intellectual and moral energies which have been for ages enslaved.

ART. III.—*On the conflicting views of European Scholars as to the Races inhabiting Polynesia, and the Indian Archipelago; and as to the Languages spoken by them.* By the Hon'ble Sir ERSKINE PERRY, President.

Presented 1st May 1852.

THE receipt of a work from England by my relative Mr. John Crawfurd,* which has probably not been yet seen by my colleagues, induces me to bring before the Society the state of a very interesting question, which has been much battled by European Scholars, and on which information may still be gathered in the East, viz. as to the races of mankind, and the languages spoken, in Polynesia and the Indian Archipelago. It is well known that over that vast region of the earth's surface, extending from what may be called, generally, the East Coast of Africa on the one hand, to the West Coast of America on the other, but more definitely from Madagascar to Easter Island in the Pacific Ocean, and from Formosa, on the coast of China, to New Zealand, including the Indian Archipelago, the Nicobars and Andamanns in the Bay of Bengal, and the Maldives and Laccadives on the Malabar Coast, two races of men, distinctly severed from each other by a marked variance of colour, exist. In some of the innumerable islands scattered over this vast region, the brown race is to be found exclusively, in others the black race, while in certain localities the blacks are to be found driven into the rugged and wild interior, and the brown race is in occupation of the coast, and of the choicer parts of the territory. An example very near at hand of this distribution may be seen in the Nicobars and Andamanns, the former† of which is occupied by the brown, the latter by the black race exclusively, and also in the Malacca peninsula, where the Negroes are to be found only in the mountainous interior.

* Grammar and Dictionary of the Malay Language, with a Preliminary Dissertation. 2 vols. 8vo. 1852.

† I saw a notice in a Calcutta newspaper within the last two or three years of a black race as inhabiting the Nicobars also, but I have lost the reference.

Amongst all these tribes a very well established connection between their languages has been detected, which the judicious Marsden was the first to point out in detail, and which he, as well as Crawfurd, considered to have originated in a great Polynesian language of some extinct race. But since the publication of the remarkable posthumous work of William von Humboldt on the Kawi language of Java,* the generally received opinion has been that the brown races at least, as well of the Archipelago as of the innumerable islands of the Pacific, and the different languages they speak, are all identical in origin. That distinguished philologist gives such an interesting view of his theory in his preliminary dissertation "*On the Varieties of Human Language, and its Influence on the Mental Development of Mankind,*" that I am tempted to make a long extract from a translation I had prepared for an educational purpose; but, as the matter is deeply interesting to Indian scholars, and the work has not yet appeared in an English dress, I trust that the Society will not deem it unsuitable for this place:—

"The races of Malay origin, with respect to locality, government, history, and, above all, language, are perhaps more singularly connected with races of different cultivation than any other people in the world. They inhabit only islands and island groups, but these extend over so wide a range as to afford unmistakeable testimony to their early acquaintance with navigation. Their settlement on the Continent at Malacca scarcely deserves to be mentioned here, as it is of modern date, and proceeded from Sumatra, and that on the coasts of the China Sea, and of the Gulf of Siam, at Champa, was a still later occurrence. With these exceptions, we are unable to trace, with any certainty, even in the most remote history, the existence of Malays on the mainland. If from these races we separate those who in a strict sense deserve the name of Malays, and who, according to undeniable grammatical researches, speak closely allied tongues, easily intelligible to one another, we shall find them settled (only mentioning those points where the inquiry into languages has had sufficient materials to work on) in the Philippines,—where the language is to be found in the richest development of forms, and in its most original condition,—in Java, Sumatra, Malacca, and Madagascar. A large number of words, however, of unquestionable relationship, and even the names of a considerable number of islands, betoken that the islands in the neighbourhood of the above localities are peopled by a similar race, and that even the more strictly so-called Malay language extends itself over all that portion of the South Pacific

* Ueber die Kawi-Sprache auf der Insel Java nebst einer Einleitung, &c. 3 vols. 4to. Berlin: 1838-39.

which reaches from the Philippines southerly to the West Coast of New Guinea, and, more westerly, to the chain of islands which joins the eastern point of Java, and runs up between Java and Sumatra to the Straits of Malacca. It is a matter for regret that the large islands of Borneo and Celebes, to which probably all that has been said above may apply, have not yet had their languages sufficiently examined to allow of any conclusion being drawn on grammatical grounds.

"To the eastward of the zone here drawn of the pure Malay language, from New Zealand to Easter Island, thence northerly to the Sandwich Islands, and then back again westwards to the Philippines, a race of islanders is to be found, who display most unquestionable traces of an old connection in blood with the Malays. This is proved by the number of similar words, and essential coincidences of physical structure, in the languages whose grammar we know intimately, such as those of New Zealand, Tahiti, the Sandwich Islands, and Tongu. A like similarity is to be found in manners and customs, especially where pure Malay customs are recognisable, unaltered by Indian usages. Whether the races to the north-west in this part of the Pacific belong wholly or in part to the latter division, or to the Malays in the strict sense; or whether they form a connecting link between the two, cannot yet be decided with our present materials, as even the researches which have been set on foot with respect to the language of the Mariana Group have not yet been made public. The whole of these races possess social institutions sufficiently complicated to make it improper to exclude them wholly from the class of civilized nations. They have a well-established, and by no means simple system of government, of religious doctrines, and of usages, and some of them possess a species of spiritual government; they display skill in various arts, and are bold and experienced seamen. We find amongst them in several spots the remains of a sacred language, unintelligible even to themselves, and their custom of recalling formally obsolete expressions into life on certain occasions speaks not only to the richness, age, and depth of the language, but also to their powers of observation as to the effect of time in modifying circumstances. With all this they allowed, and still partly allow, barbarous practises inconsistent with civilization.* They appear never to have acquired the art of writing, and, consequently, are deprived of all that literature which is founded upon it, although they are by no means wanting in fanciful legends, impressive eloquence,

* Mr. Crawfurd mentions a somewhat cultivated race in Sumatra, well acquainted with letters, who appear to be the only literary cannibals recorded in history.—E. P.

and poetry in defined rythmical cadence. Their languages, however, have not sprung out of any corruption or change of the Malay tongue of the narrower zone, but we may rather trace in them an unformed and original condition of the latter.

"Along with the race thus described in the two divisions of the Great Southern Archipelago, we meet, on some of the islands, with people who, from their appearance, must be attributed to a wholly different stock. Both the Malays in the stricter sense, and the more eastern inhabitants of the South Sea, belong without doubt to the same human family, and they form, if one makes an accurate division by colours, the class passing from the light browns into white. The races of whom we are now speaking approximate, by their black skin, occasionally by their woolly frizzled hair, and by their peculiar features and build, to the African Negro, although, according to the most trustworthy evidence, they are nevertheless essentially different, and can by no means be considered as the same race. Writers on these countries, in order to distinguish them from Negroes, call them either Negritoes or Austral-Negroes, and but few of them exist. Both in the islands inhabited by the Malay races, and in the Philippines, they usually occupy the middle of the island, and inaccessible hills, to which they appear to have been gradually driven by the more numerous and powerful white race. We must carefully, however, distinguish them from the Haraforas, or Alfuris, the Turajos of Celebes, who are to be found in Borneo, Celebes, the Moluccas, Mindenao, and some other islands. These latter appear to have been driven out in a similar manner by their neighbours, but belong to the light brown race; and Marsden attributes their disappearance from the coast to Mahomedan persecution. In wildness they approximate to the black race, and they constitute a population of uniformly low development. Other islands, amongst which are some large ones, like New Guinea, New Britain, New Zealand, and some of the Hebrides, contain these Negro races only, and the inhabitants of the large continents of New Holland and Van Dieman's Land, so far as there has been hitherto opportunity of becoming acquainted with them, belong to the same race. But although this race in all the localities here indicated displays general marks of similarity and relationship, it is by no means thoroughly established how far essential differences of race exist among them, for their language has not yet been investigated so as to satisfy the exigencies of a thorough grammatical inquiry. We have only the materials collected by the Missionary Trelkeld as to one race in New South Wales, by which we are enabled to form any judgment as to its organic and grammatical

structure. The race everywhere distinguishes itself by a greater wildness and barbarism than appears in the lighter races; and the differences herein relate solely to their greater or less intercourse with the latter. The inhabitants of New Holland and Van Dieman's Land appear to stand on the lowest grade of civilization which has ever yet been occupied by mankind. It is a remarkable phenomenon to meet, even on the peninsula of Malacca, the light and dark races in contact with one another, for the Semangs, who occupy part of the mountain range of that country, are by most unquestionable testimony a woolly-haired Negrito race. As this is the only point of the mainland of Asia where the fact occurs, it is unquestionable that immigration must have taken place here at a comparatively recent period.* Among the lighter races, also, as the Malay expression *orang benna* (men of the country) appears to prove, more than one immigration seems to have occurred. Both occurrences only show, therefore, that the same kind of connection between countries at different periods brings about similar historical facts, and, consequently, to this extent there is nothing remarkable in them. In reference to the state of culture of the different races of mankind in this Archipelago, however, any explanation by means of colonization becomes deceptive. To enterprising nations, the sea offers rather a means of easy connection than of distinct separation, and the general diffusion of bold active seamen, like the Malays, explains itself in this way by short trips from island to island, sometimes intentionally made, and sometimes by their being driven away through the violence of the prevailing winds; for activity, expertness, and knowledge of sea-craft, are not characteristics of the proper Malay only, but are to be found amongst the whole of the light brown race. I need only mention here the Bugis of Celebes, and the South Sea Islanders. But if this description of the Negritoes, and of their diffusion from New Holland to the Philippines, and from New Guinea to the Andamanns, is correct, these races must have deteriorated more than is usually supposed from a more civilized condition, and have become wild. Their present condition rather favours the hypothesis, which is not in itself improbable, of revolutions of nature, old traditions of which still exist in Java, by which a populous continent

* Yet it is strange that Herodotus records amongst the ranks of Xerxes' army a Negro race from India, who appear to have been brigaded with the Hindus, and who, says the father of history, were only distinguished from the African Negro by their language, and by not having woolly hair. See Lassen's Alterthumskunde, vol. i. where he points out other evidence of an aboriginal black race in India; and the subject seems worth pursuing.—E. P.

became broken up into the present island groups. Men, like ruins, might, so far as mankind could survive such convulsions, have remained on the scattered island tops. Both of these explanations, perhaps, if united, so as to consider the dislocation by the powers of nature as occurring during a lapse of centuries, and distinguished from the connection through human colonization, might perhaps afford us some sort of account of the various races which now appear.

"Tanna, one of the Hebrides, but a word of Malay origin, New Caledonia, Timor, Ende, and some other islands, possess a population which is left doubtful after inquiry whether we are to reckon it, with Crawfurd, as a third race, or, with Marsden, as a mixture of the two others; for the inhabitants, in their physical make, woolliness of hair, and colour of skin, occupy a middle place between the light brown and black races. If, at the same time, a similar affirmation can be made as to their language, this circumstance would tell authoritatively for their being a mixed race. There still remains an important question, but one very difficult to decide from the materials at hand, viz. how far older and more intimate mixtures of the white and black races have occurred in these countries, and how far gradual changes may thereupon have ensued in language, and even in colour and growth of hair, the woolliness of which, moreover, in some localities, is cultivated as an ornament. To judge correctly of the Negro races in their pure form, we must always commence with the inhabitants of the Great Southern Continent, as between these and the brown races no direct contact is conceivable, and according to their present condition it is difficult to suppose any kind even of indirect connection. The remarkable fact still remains, that many words in the languages of these races, although we certainly possess only a few of them, bear an evident likeness to the words of the South Sea Islands.

"Amid these geographical relations, in some instances amounting to close neighbourhood, certain Malay races adopted Indian civilization to such an extent that perhaps no similar example is to be found of a nation undergoing such a complete infusion of the national spirit of another race, without losing its own independence. The phenomenon as a whole is very intelligible. A large part of the Archipelago, and the most attractive from its climate and fertility, lay at a very short distance from the great continent of India—opportunities and points of contact were consequently abundant. But where such occurred, the preponderating influence of a civilization so ancient, and so diffused through every branch of human activity as the Hindu, could not fail to attract towards it other nations of active and impressionable temperaments.

This was rather a moral than a political revolution. We recognise it in its consequences in the Hindu elements, which undeniably present themselves to view in a certain range of Malay races; but how did this mixture arise? On this point, even amongst the Malays, as we shall see, nothing but obscure and doubtful traditions exist. If inroads of powerful races and extensive conquests had produced this state of things, clearer traces of such political events would have been preserved. Intellectual and moral causes work, like nature herself, in silence, and their operation is similar to the growth of a seed, eluding observation. The *modus operandi* in which Hinduism struck root amongst the Malay races proves that as a mental spring of action it excited the imagination, and became powerful through the impressions of wonder which it produced in races susceptible of culture. In India itself, so far as I know, we find no mention of the South-eastern Archipelago in Hindu history or literature. Even if Lanka were perhaps considered to extend further than the limits of Ceylon, this was only dark and uncertain surmising, or mere poetical license. From the Archipelago itself, on the other hand, as we may well conceive, nothing proceeded which could have any influence on the mainland. It was India that exerted a substantial influence, and perhaps even by colonization, which was not intended to keep the mother country in view as a home, or to preserve relations with it. Reasons for establishing settlements might be various. How far Budhist persecution might have co-operated I shall have to discuss hereafter.

"But to explain properly the mixture of Malay and Hindu elements, and the influence of India on the whole of the Indian Archipelago, we must discriminate between its different modes of operation, and thereby commence with that which, early as it may have began, has continued to the latest times, and consequently has left the clearest and most indelible traces. It is not only the influence of a spoken foreign language which in this case, as in all mixtures of nations, operates powerfully, but also the whole of the mental culture which springs out of it. This phenomenon is unquestionably apparent in the introduction of Indian language, literature, myths, and religious philosophy into Java. The whole purport of the following work is to discuss this question, but principally with reference to language,—I therefore must content myself here with this mere allusion. This species of influence affected only the Indian Archipelago, properly so called, and the Malay zone in its stricter sense; but possibly not even the whole of the latter, and certainly not to an equal extent. The focus was so undoubtedly Java, that we may reasonably doubt whether that island was not the

immediate source from which it extended itself over the rest of the Archipelago. Independent of Java, we find, however, distinct and complete proofs of Indian civilization amongst the proper Malays and Bugis of Celebes. A true literature, from the essential elements of the formation of language, is only capable of existing contemporaneously with a written character which is in daily use. It is an important fact, therefore, for the mental development of the South-eastern Archipelago, that just that portion of the island group which has been designated as strictly Malay possesses an alphabetic character. A distinction not to be overlooked, however, here occurs. The alphabetic character in this part of the world is Indian. This arose naturally from the intellectual relations of these countries, and is visible in most of their alphabets, with the exception perhaps of the Bugis, in the similarity of the letters, not to mention their arrangement to designate sounds, which undoubtedly does not furnish any decisive proof, as it might have been adopted subsequently to a foreign alphabet. Nevertheless, a complete similarity, with merely an adaptation to the simpler phonetic system of the indigenous tongues, occurs only in Java, and perhaps at Sumatra. The character of the Tagalis and of the Bugis is so different, that it may be regarded as an example of alphabetic invention. In Madagascar the Arabic character has planted itself, as the Indian has done in the centre of the Archipelago. At what period this occurred is uncertain. And there does not appear to be any trace of an original character which it displaced. The use of the Arabic character amongst the Malays proper decides nothing as to their intellectual relations, which we are now discussing, for it is notoriously a modern introduction. I have already mentioned the total want of all writing in the South Sea Islands, and amongst the woolly-haired races. The traces of Hinduism which we have here in sight are so distinct that we may recognise them everywhere without difficulty, and we can distinguish them as foreign elements. No true intermixture or amalgamation is here discernible, but a mere mosaic union of foreign and native. So far as relates to manners and customs, we may clearly recognise in Indian antiquity the foreign words in the Sanskrit descended to us, and which have not entirely lost their grammatical forms: we may even discover the laws which governed the transplantation of foreign elements of speech into a native soil. This is the foundation of the cultivated and poetic language of Java, and is closely connected with the introduction of literature and religion. All that has been said above undoubtedly has not operated with the language of the people, and still less can it be affirmed, that merely because Indian words are to be found in it they

were introduced in a similar manner. In thus tracing minutely the operations of the different modes of Indian influence, two deeply-seated questions arise, suggested by actual phenomena, but which are extremely difficult to answer accurately, viz. whether the whole of the civilization of the Archipelago is traceable to an Indian origin; and whether, from a period anterior to the rise of literature, and to the last and most complete development of the language, any connection existed between the Malay and Sanskrit languages, which is still capable of being traced in the social elements of speech?

"I am inclined to answer the former of these questions in the negative. It appears to me to be made out that the brown race had an original civilization of their own. It is still to be found in the Eastern portion, and is not altogether unrecognizable in Java. It may, indeed, be said, that the population of the Archipelago principally issued from its centre, where the influence of India was most powerful, and extended itself thence towards the east, so that the distinct Hindu element becomes more diluted at each extremity. This proposition, however, is supported, less by any distinct similarity than by remarkable coincidences in manners, which have nothing specially Indian to distinguish them, amongst the races of the central and eastern parts of the Archipelago. One sees also no reason why we should deny to a race like the Malay a self-developed civilization, in whatever subsequent direction the march of population, and their gradual culture may have been. A proof is even afforded by the readiness of the different tribes belonging to the race to adopt the Hinduism imported among them, and, still further, by the manner in which they still retain the indigenous element, and scarcely ever allow its peculiar form to merge in the Indian. The contrary would have happened if these races had been wild, uncultivated savages, when Indian colonization first came in contact with them. When I speak here of Hindus, I of course only mean people speaking the Sanskrit language, and not the inhabitants of the continent of India generally. How far the one race came in contact with, and was, perhaps, driven out by the other, I do not now enter upon, as my purpose is only to show the different elements of civilization by which the Malay races were influenced.

"The second question, which alone relates to language, must, I conceive, be answered in the affirmative. In this respect the limits of Hindu influence have a wider range. Without mentioning the Tagali, which contains a tolerable number of Sanskrit words, with completely different meanings, there are to be found, even in the languages of Madagascar and the South Sea Islands, both words and sounds belonging

to the Sanskrit, and in such an elementary part of speech as the pronoun; and even the modes of change of sound, which may be looked upon as a good comparative test of the period of introduction, are different in the languages of the narrower Malay zone, in which, as in the Javanese, it is notorious that the influences of Hindu literature and language displayed themselves at a much later period. It becomes, therefore, a matter of great difficulty to explain this phenomenon, and to ascertain what reciprocal operation these two great families of languages have on one another. At the end of this essay I will return to the subject, as it is sufficient for me here to call attention to the influence of Sanskrit on the Malay languages, which appears to be distinct from the subsequently introduced mental cultivation and literature, and to belong to a much earlier period, and to different connections between the two races. I shall subsequently touch on the languages of the Negro races, but must make the preliminary remark now, that if in some of these tongues, as in the Papuan of New Guinea for example, similarities with Sanskrit words are to be found, this does not at all prove any immediate connection between India and those islands, as such common words might have been introduced through the commerce of the Malays, just as we see now with Arabic terms.

"On seeking, therefore, to take a general view of the state of the civilization of the great Archipelago, we find the Malay populations to be hemmed in, as it were, between influences and characteristics which are strongly contrasted. On the same islands and island-groups, which still contain races on the lowest level of civilization, or where at all events such tribes once existed, we find a very ancient state of culture, which had borne choice fruits, and which, derived from India, had become indigenous." The Malay races have appropriated this culture, in nearly all its parts, to themselves. Herein they may be perceived to be connected in race with the inhabitants of the South Sea Islands, who, compared to them, may be looked on as savages; and it is even doubtful whether their language is altogether strange to the Negro races. The South Sea Islanders have kept themselves distinct from those rude races by institutions peculiar to themselves, and by a language which in its present form is quite their own. The population of the Great Archipelago, which, according to our present knowledge, cannot be traced to the continent of Asia, is found in places where all foreign influence must be left out of consideration, in a most rude and savage state, or on the lowest step of civilization. This is especially true if we regard only the Negro races and the South Sea Islanders, and exclude the Malay races, strictly so called, although no very

sufficient ground presents itself for ascribing to these races a much higher station in civilization before Indian influences had operated upon them. We still find, even with the Battas of Sumatra, whose myths and religion display unmistakeable traces of Hindu influence, the barbarous custom of cannibalism on certain occasions. The Great Archipelago, however, extends itself along the whole coast-line of Asia, and connects itself with both its extremities, stopped only by Africa on one side, and America on the other. Its centre lies at a considerable distance, so far as navigation is concerned, from the nearest point of the continent of Asia. At different times, therefore, it has been acted upon from the three great focuses of the earliest awakening of the human mind amongst mankind—China, India, and the seat of the Semitic races. It has felt the different influences of all of them at proportionately remote periods. To its earlier progress India alone contributed anything of importance; Arabia nothing, even if we except Madagascar; and China just as little of importance, notwithstanding its early settlements."

It will be seen by the above extract, that William von Humboldt arrived at the conclusion that the Malay language was the stem from which the various dialects spoken by the brown races inhabiting this vast portion of the globe had branched out. He also thought it an indisputable fact that all these brown races belonged to one family of nations, the Malay;* and in his explanation of the phenomenon of one race, and one universal language, being thus diffused over such a wide surface of the globe, and throughout such distantly severed localities, he appears to have supposed that a great convulsion of nature had occurred, by which a mighty continent had been shattered and overwhelmed, leaving only its mountain tops, with a few survivors clinging to them, to constitute the innumerable isles and islets of what has been so happily termed Polynesia. He also conceived that a clear connection existed between the Sanskrit and Malay languages, prior in time to the subsequent influence which Hinduism had impressed on the Malay language and on Malay civilization through the joint means of commerce and religion; and therefore that in all probability the Malayan tongue belonged to what has been latterly termed the Indo-European family of languages. He would also seem to be of opinion that when increasing knowledge made us more intimately acquainted with the languages of the black races, they also would be found to be closely connected with the Malay. His Editor, Buschmann, carrying out the views of his author still further, announces that he is

* Kawi Sprache, vol. ii. p. 216.

prepared to show in a forthcoming work, by analogous reasoning, that the various languages of America, which even Humboldt thought were distinct, are all closely allied tongues.

The profound philological qualifications which William von Humboldt brought to the investigation of these interesting phenomena are too well known to require remark; but they are well tested in the present inquiry by his demonstration of the true character of the mysterious Kawi language of Java, now obsolete in that island, but still the language of religion and law in the neighbouring island of Bali, where the Brahmanical faith has kept its footing. Sir Stamford Raffles, in his work on Java, considered it to be a foreign language, of unknown origin, imported into that island. Crawfurd, in his history of the Indian Archipelago, perceived its connection with Javanese, but deemed it to have been merely a written language of the priests. William von Humboldt proved, however, by a thorough scientific analysis, that the language is merely an archaic form of modern Javanese, though plentifully interspersed with Sanskrit terms; and subsequent inquiries have arrived at exactly the same conclusion, though by different premises.

Mr. Crawfurd, at an early period of his life, whilst in the Company's service, spent twelve years in places where the Malayan and Javanese languages are vernacular; the former portion of the time in the island of Java, under Sir S. Raffles, the latter at Singapore, of which he was the first Resident. At these places he obtained that insight into the vernacular tongues which active Indian administrators are so often seen to acquire, and from his work on the Archipelago, and the rich collections which he made on the spot, it will be observed that Baron William Humboldt derives the principal portion of the materials for the conclusions he draws in the work published after his death in 1838. Indeed, his illustrious brother, Baron Alexander Humboldt, in his preface to the posthumous work I have before mentioned, admits, that without the materials thus freely contributed by Mr. Crawfurd, the work in question could not have been produced; and the graceful terms in which the gratitude of the two most distinguished scholars of Europe is there expressed, must have been deemed an ample recompense for years of literary toil by him to whom they were addressed.

Mr. Crawfurd now comes before the world, as he tells us, with a work, which contains the result of labours, spread, though with various interruptions, over more than forty years; and I trust I am not misled by partiality for the author when I state my conviction that the mass of information, and originality of views, condensed in the thin octavo

volume which contains the preliminary dissertation, will awaken in no slight degree the attention of that distinguished school who are prosecuting the study of comparative philology in Continental Europe with an ardour little appreciated in India, and with results tending to throw the greatest light on the most interesting questions connected with the diffusion of the human race.

As the conclusions drawn by Mr. Crawfurd are diametrically opposed to those of William von Humboldt, it is well to recollect that the two authors come in conflict in different characters—the one a profound scholar, with all the information that the closet and devotion to the study of comparative philology can confer; the other a practical man, with accurate personal knowledge of the localities and of the races, and possessing, what the great Humboldt wanted, an intimate acquaintance with the chief vernacular languages on which the inquiry turns.

Mr. Crawfurd holds—1st. That there is no foundation for the prevalent idea that, Negroes excepted, all the descriptions of men in the limits I have above described belong to the same race—on the contrary, there are several races.

2nd. He also contends that many of the nations belonging to the same race, for example the Malays and Javanese, speak distinct languages.

3rd. He holds that the black race, the Austral-Negroes, or Negritoes, are not identical, and that their languages, like their races, are also distinct.

4th. He admits that the Polynesians speak one very largely diffused language, with dialectic differences, but maintains that it is quite distinct from the Malay.

In order to place the conflicting views of these two writers in closer opposition, it will be well to recapitulate the leading facts, and these are that in all the islands, from Madagascar to Easter Island,—a zone, I may recall to mind, embracing much more than half the circumference of the globe,—an infusion of the Malay language is to be found, with more or less of foreign adjuncts from Sanskrit and Arabic sources. Further, it is indisputable that in many of the insular languages considerable resemblances in grammatical construction and organic formation of sounds may be discovered. According to Humboldt, the Malay language (the purest form of which, he asserts, is now to be found in the Tagala, one of the languages of the Philippines,) is the mother language of this vast affiliation. But as in so widely a diffused family of languages there will be synonymes for very many of the leading ideas, one term being used by one nation, one by another, it may turn

out on comparison of different languages that not very many words are used by different groups in common. Humboldt, therefore, considers that the grammatical construction, and, above all, the accordance of grammatical sounds in two languages, is the most convincing proof of affinity. He lays down, accordingly, the following method, which he prescribes to himself:—

"I therefore shall not confine myself to a comparison of words, but especially address myself to the grammar. It will then appear that these races not only express their ideas in the same manner, but follow the same path in their forms of speech, form their words and construct their sentences with the same sounds, and according to the same laws, and therefore possess concrete grammatical forms, borrowed from one another. A language cannot be looked on as a mere aggregate of words. Every language is a system by which the mind embodies an idea in audible expression. It is the business of a philologist to discover the key to this system."

Mr. Crawfurd, on the other hand, objects to both of these tests, viz. the essential identity of a few words, and the supposed similarity of grammatical structure, the latter of which, when applied to languages of remarkably simple forms, such as those under discussion, affords but few salient points for comparison.

"With respect to the test by the identity of words," Mr. Crawfurd writes, "it has been imagined by some writers, that when the class of words expressing the first and simplest ideas of mankind are the same in two or more languages, such languages may be considered as derived from the same stock. This certainly does not accord with my experience of the Malayan and Polynesian languages, into which, from the simplicity of their structure, I find that well-sounding foreign words very readily gain admission. Instead of words expressing simple ideas being excluded, I should, on the whole, owing to the familiar and frequent use of the ideas, consider them the most amenable to adoption of any class of words whatsoever. Accordingly, such words will be found either to have supplanted native terms altogether, or to be used as familiar terms along with them. Thus, to give some examples in Malay: the most familiar words for the head, the shoulder, the face, a limb, a hair, a pile, brother, house, elephant, the sun, the day, to speak, to talk, are all Sanskrit.

"In Javanese we have from the same Sanskrit the head, the shoulders, the throat, the hand, the face, father, brother, son, daughter, woman, house, buffalo, elephant; with synonymes for the dog, and hog, the sun, the moon, the sea, and a mountain. In the language of

Bali, the name for the sun in most familiar use is Sanskrit, and a word of the same language is the only one in use for the numeral ten. It is on the same principle that I account for the existence of a similar class of Malayan words in the Tagala of the Philippines, although the whole number of Malayan words does not exceed one-fiftieth part of the language." (The Tagala, it will be recollected, is the language which William von Humboldt indicates as the purest form of Malay.) "In the Maori, or New Zealand, the words forehead, sky, goat, stone, fruit, to drink, to die, are Malay or Javanese—yet of these two tongues there are not a hundred words in the whole language. As to the personal pronouns, which have often been referred to as evidence of a common tongue, in as far as concerns the language under examination, they are certainly the most interchangeable of words, and cannot possibly be received as evidence. Some of them, for example, are found in the Polynesian dialects, where, in a vocabulary of five thousand words, a hundred Malayan terms do not exist. The numerals must surely be considered as out of the catagory of early invented words, for they imply a very considerable social advancement, and seem to be just the class of words most likely to be adopted by any savages of tolerable natural capacity. The Australians are not savages of such capacity, and although with the opportunity of borrowing the Malayan numerals, they have not done so, and in their own languages count only as far as 'two.' "

Mr. Crawfurd then proceeds to submit his own test of a common language, and I subjoin it for the examination of the philologists belonging to our Society, whether in India or on the banks of the Tigris, who are engaged in kindred researches:—

"The words which appear to me most pertinent to test the unity of languages are those indispensable to their structure; which constitute, as it were, their framework, and without which they cannot be spoken or written. These are the prepositions, which represent the cases of language of complex structure, and the auxiliaries which represent times and moods. If a sentence can be constructed by words of the same origin in two or more languages, such languages may be safely considered as sister tongues—to be, in fact, dialects, or to have sprung from one stock. In applying this test, it is not necessary that the sentence so constructed should be grammatical, or that the parties speaking sister tongues should be intelligible to each other. The languages of the South of Europe can be written with words common to them all, derived from the Latin without the assistance of any of the foreign words which all of them contain. The common stock, therefore,

from which they are derived is Latin, and they are sister tongues. English can be written with great ease with words entirely Anglo-Saxon, and without any French words, although French forms a sixth part of the whole body of its words, but no sentence can be constructed consisting of French words only. The parent stock of our language therefore is not French, nor Latin, but Anglo-Saxon. By this test the Irish and Gaelic are shown to be, virtually, the same language, and the Welsh and Armorican to be sister dialects; but it will not prove that the Welsh and Irish, although they contain many words in common, are the same language, and derived from the same source.

"Applying this test to the Malayan languages, it will be found that a sentence of Malay can be constructed without the assistance of Javanese words, or of Javanese without the assistance of Malay words. Of course either of these two languages can be written or spoken without the least difficulty without a word of Sanskrit or Arabic. The Malay and Javanese, then, although a large proportion of their words be in common, are distinct languages, and as to their Sanskrit and Arabic elements, they are extrinsic and unessential. When the test is applied to the Polynesian languages we find an opposite result. A sentence in the Maori and Tahitian can be written in words common to both, and without the help of one word of the Malayan which they contain, just as a sentence of Welsh or Irish can be constructed without the help of Latin, although of this language they contain at least as large a proportion of words as the Maori or Tahitian do of Malayan. The Maori and Tahitian are therefore essentially the same language, and their Malayan ingredient is extrinsic."

According to Crawfurd's view, the Malayan races have diffused themselves, and the civilization which they attained by self-derived culture, from two distinct and independent centres. The Malayan-speaking Malays from the rich table-lands of the interior of Sumatra,—Sumatra, which, from its physical gifts, and large proportion of coast-line abutting on placid seas, would be at once seized on by the geographer as a focus of civilization; and the Javanese-speaking Malays from Java, an island not less richly endowed in physical advantages. The mode in which these races were enabled to come into contact with distant localities, such as Madagascar and the South Sea Islands, is minutely explained by reference to existing facts, and the evidence on this subject is not dissimilar to that collected by Sir Charles Lyell in support of his celebrated theory of geology.

The contact of the Malays with Hinduism is not less satisfactorily explained, and some curious facts connected with the commerce of the

East are brought to light. There is no doubt that a portion of the transit by which the much-prized products of the Spice Islands were conveyed to Rome was conducted by Hindus, and when the Europeans first came in contact with the races of the Archipelago in their own waters, they found an active commerce in existence between the Hindus of the Coromandel Coast and the Malays. Barbosa, a highly intelligent traveller, describing Malacca before its conquest by Albuquerque in 1511, says: "There are here many great merchants, Moors as well as Gentile strangers, but chiefly of the Chetis, who are of the Coromandel Coast, and have large ships, which they call giunchi" (junks). And again: "The merchants of the Coromandel Coast, called Chetis, who dwell among them, (the Malays,) are for the most part corpulent, and go naked from the waist upwards."* Mr. Crawfurd observes that "the word here given as Chetis there can be little doubt is a misprint for Kling, or Chleng,† which is the local name that would be given to the Hindu traders on the spot." But, with deference to so accurate an observer as Mr. Crawfurd, it would seem that Barbosa described the Hindu merchant by his own Tamil name; and his accurate description of the Coromandel Chitty, or Banyan, is a picture to the life, such as he may be seen at the present day, and with the same name, at Madras, or in the island of Ceylon.‡ Indeed, the similarity of the term Chitty, or Chetijs as Ramusio writes it, to the word used by the Marathas in the Deccan, Shetti, to denote the trading classes, points out the common origin of the word in the Sanskrit word *S'restin*, a trader. I may further observe that a large body of evidence will be found collected in Ritter, and which Crawfurd seems to have overlooked, that tends to show Ceylon to have been the spot, at the commencement of the Christian era and subsequently, where the enterprising seafaring Hindus of Talinga, the Chinese with their heavily-laden junks, and the Arabs from the African Coast, assembled, in order to interchange the products of the East and West.§

* Ramusio, vol. i.—cited by Crawfurd.

† From Kalinga, which is the term applied by the Malays to denote India, being a corruption of Talinga, from whence the commercial Hindus issued to drive their trade in the Archipelago and elsewhere.

‡ So also Paolini distinguishes the traders of the Coromandel Coast by their native name from the Banyans of the Malabar Coast. Speaking of Cochin, he says: "Gli Ebrei i Baniani e li *Cettis* o Canarini vi hanno molti magazini." Cited by Marsden, Travels of Marco Polo, p. 679.

§ For example, Sopater, the friend of Cosmas, found many Chinese junks at Ceylon circa A. D. 560. So Ibn Batuta, A. D. 1340, found thirteen junks at Calicut, waiting for the monsoon to return to China. See Ritter's Asien, vol. iv. p. 502; vol. v. p. 28.

It would be tedious here to give the views of Mr. Crawfurd as to the mode in which two limitrophic nations, speaking distinct languages of simple structure, might be led to borrow a similar grammatical structure from one another; but the theory will inevitably remind the reader of the interesting essay of Adam Smith on the formation of language. Nor can I condense the substantial portion of the evidence on which the principal conclusions are founded. But with respect to the Tagala language, on which Humboldt has laid so much stress, as the purest form of the Malay, Crawfurd, after a minute analysis of its grammatical structure, denies wholly its alleged parentage, and gives the following result of a close examination of the 16,482 words in the Tagala Dictionary, published by Father Juan de Nouda:—

Malay and Javanese words	399
Sanskrit	33
Arabic	7
Persian	2
Telinga	1

This makes little more than one thirty-eighth part of the language.

I think that the sketch which I have given of the leading views of the two works under discussion may possibly show that the brilliant generalizations of Humboldt are scarcely reconcileable with the facts which the industry of subsequent writers has brought to light. Baron Humboldt, in a passage of noble eloquence in his *Essay on the South Sea Languages*, points out the causes which kept the nations of antiquity and of the middle ages in gloomy isolation. "But," he continues, "if there is any one idea which shines out conspicuously throughout all history in ever-increasing brilliancy,—if there is any idea which tends to prove the much-contested, and still more misunderstood, perfectibility of the human race,—it is the idea of HUMANITY. The endeavour to remove the boundaries which the prejudices and mutually conflicting selfish views of mankind have set up amongst one another, and to consider the whole of the human race, without reference to religion, nation, or colour, as one great family—an organic whole, bent on the attainment of a common end—the free development of its mental powers,—this is the grand and ultimate aim of society; and, at the same time, it contains within itself the true direction of man towards the indefinite development of his being. He looks upon the earth as it lies extended before him; the skies, so far as they are visible; the stars, with their eternal fires; and in his inner mind he considers them as his own, bestowed on him for contemplation and activity. Even as a child he sighs for heaven; to cross the seas; to

pass the limits of his narrow homestead; and then, again, like a plant, pines for his native soil,—just as all that is animating and beautiful in man, by directing his aspirations either to something longed for, or to something lost, prevents him from being bound up exclusively with the present."

Grand and animating views like these led the illustrious author to look upon general philology as one of the handmaids by which the nations of the earth might be brought into closer brotherhood, and he gave to the elaboration of the science the better part of his existence. If the generalizations thereby suggested have been too hasty, and if the additional body of facts which have been brought to light by Mr. Crawfurd and others* demonstrate that the time has not yet arrived for such large and world-comprehensive theories, this conclusion will only accord with the march of science in other departments of knowledge, and will point out, which is the end I desired principally to indicate in the present paper, that the field is still open for inquiry, and that a rich harvest still awaits the patient student and attentive observer amongst the countless tribes of the Indian and Pacific Oceans.

I may, perhaps, add, that I never arise from inquiries of this nature, which, from their union of fact and mystery are to many minds indescribably interesting, without being deeply impressed that the same great fact which the science of geology has indisputably established, viz. the recent appearance of man on the surface of the globe, is equally clearly proved by the study of ethnography, with the addition that the *recency* of the event becomes a chronological date, not one of geology.

* The reader is referred to a very interesting series of papers on the "Ethnology of the Indo-Pacific Islands," now in the course of publication in the *Journal of the Indian Archipelago*, by its able editor, Dr. Logan.

ART. IV.—*The Theory of the Great Elephanta Cave.* By the Reverend J. STEVENSON, D.D.

Presented 13th May 1852.

THE Caves of Elephanta have been so often described, and the last description of them, by Mr. Erskine, in the first volume of the Transactions of the Bombay Literary Society, is so excellent, that it may seem unnecessary to add anything to what has been already written with so much accuracy and detail. But the very excellence of Mr. Erskine's description, especially the minuteness with which he dwells on some particulars, has been one of the causes of my attempting to furnish a sketch, which, taking for granted what he has proved, and omitting what is of inferior moment, might better serve the purpose of the numerous visitors to Elephanta, who are not deeply versed in Hindu lore. At the same time, I am not without hopes of being able to exhibit to the general reader the theory of those interesting excavations, with a greater fulness and simplicity than has hitherto been done.

My literary readers will find in the notes appended some farther observations on the subject, and proofs which could not well be introduced into the narrative, and which will enable them better to judge of the accuracy of the theory of the caves, which, following Mr. Erskine in the general outlines, I have filled up, and illustrated from the Hindu sacred literature.

THE NAME ELEPHANTA.

The name Elephanta has been derived from a stone elephant, having, it would seem, originally a tiger on its shoulders, which stood near the southern landing-place. That figure, after successively losing its different members, crumbled down a few years ago into a mass of ruins, now scarcely distinguishable from the surrounding stones. The name Elephanta is still unknown to most of the uneducated natives, who call the island Gárapurí, (Gahrapooree,)* *i. e.* the Town of Excavations.

* The orthography of the text is the Jonesian; that within parentheses is intended to represent the sound better to the mere English reader.

The caves are called Lene*n*, (Laina,) a word used throughout India and Ceylon for these artificial grottoes, most probably on account of the first of them being intended for hermitages to Buddhist ascetics.

TIME OF CONSTRUCTION OF THE CAVES.

The time when these caves were excavated can only yet be guessed at, but it is supposed that it must have been some time between the eighth and twelfth centuries of the Christian era. The main reason for this supposition is, that from inscriptions and tablets found in various parts of Southern India, and architectural structures whose age is known, it seems that the religious system to which the carved images and architectural embellishments belong, had not gained much currency before the first mentioned of those eras; and, owing to their conflicts with the Mahomedans, the Hindu Rajas, it is surmised, would not be able to give attention to such works after the last mentioned period. The rock, also, out of which the caves are excavated, being full of rents, the water penetrates through it, and detaches piece after piece from the figures, so as to threaten to destroy them one day altogether. This process, then, it is conjectured, if the caves had been of very ancient date, would by this time have occasioned a greater degree of damage than we find has actually taken place. This damage, since the caves were first described by Niebuhr, has been very considerable, and several Europeans in Bombay can testify that even during the last quarter of a century it has been by no means immaterial.

THE LINGA CHAPEL.

The Great Cave at Elephanta is what the Hindus call a Síva Linga (Sheewa Ling) Temple, a class of sacred buildings very common in Southern and Central India. Many of the Brahmans in Bombay will not acknowledge its claim to this honor, and the place is now nearly deserted. They, with other natives, maintain that this and all the rest of the excavations around are the works of the sons of Pándu, who constructed them while wandering about the country in banishment from their native land. They imagine these excavations works far too mighty for the degenerate mortals of our day, a misconception which it is to be hoped the railway works, now in progress, will soon clear away. The reason why this temple has been deserted may have been the unhealthiness of the island, which, during certain seasons of the year, is very prolific of ague; or perhaps the first Europeans may have desecrated the images, and led the Hindus to abandon them. Although the current tradition that the Portuguese fired into the cave

from the offing, and hauled guns up the hill to its mouth to destroy the idols. is absurd, and could never, even if true, account for the actual damage done, as every visitor may easily satisfy himself; still it is not improbable that they desecrated the place, and that hence arose those popular stories. The Great Cave is nevertheless still visited by Hindus, especially of the Banyan caste, on the great festivals of Síva, and the great Ling is worshipped on these occasions by crowds of devotees.

After entering the Great Cave from the usual entrance on the north, the popular object of worship, which more particularly attracts the devotees above mentioned, is seen about half way up on the right hand, or towards the west of the cave. It is a conical stone called the Ling, and is enclosed in a square chapel with four doors, facing the four principal directions. The Ling is intended to represent Síva in his character of the prolific power of nature. Around this chapel on the outside are a number of large figures, representing door-keepers, who are supposed to be high caste Hindus. They lean on dwarfs, intended I suppose for low caste men, but called by the Hindus Pis'áches, (Peeshachas,) or demons. This, then, is the principal object of popular worship. All the other figures in this excavated temple are to be considered merely as subsidiary to this, and might rather be compared to our historical frescoes in Europe than to anything else. At most they can but be considered analogous to the pictures in churches in Southern Europe, additional to the altar-piece, which receive a degree of homage far inferior to that reserved for the patron saint.

THREE-FACED BUST, OR TRIMURTI.

The chief of the mural figures is the immense three-faced bust, nineteen feet in height, which faces the northern entrance. It is the representation of Síva (Sheewa) in his three-fold character of Brahmá, Vishnu, and Rudra, (Brumma, Vishnoo, and Roodra). The Hindu notion of the deity is, that God is essentially one, but that when the time for the renewal of the world arrives, he causes to emanate from his essence three impersonations of the divinity, one who creates, a second who preserves, and a third who destroys. The three-faced figure, then, called by the Hindus a Trimurti, (Treemoortee,) is intended to represent these three gods, who emanate from the one divinity, and still continue united in him. According to the system of Hinduism followed in these sculptures, the eternal divinity is Síva, in another system it is Vishnu, and in a third the principal goddess of the Hindus. Síva is sometimes represented with five faces, and it has

been surmised that this three-faced bust is intended to represent him in that form, one of the heads being hid behind, and another above. I have seen representations of this five-faced Síva, but in those figures part of all the five faces were visible, four arranged round the head, and one peeping out from the crown before the knot of twisted hair. In the other figures, especially that of Brahmá, as carved in these caves, a portion of all the faces any being is supposed to have are always represented. We do not, then, need to go to the Greek and Roman representations of the three-faced Hecate, as preserved in ancient sculptures, for an illustration of the theory for which we contend, when we find it universally adopted by Hindu artists, and even in these very caves. The bust, then, represents a three-faced god.

The central face—the one that immediately fronts the spectator in this triple bust—is intended for Síva in the character of Brahmá the Creator. Brahmá, again, I have little doubt, is the impersonation of the Brahman caste,—the originator of all the sacred rites and ceremonies of the Hindus. He is represented as an ascetic Brahman, with his characteristic gourd in one hand, to serve for a drinking vessel. The face to the spectator's right, and to the left of the bust, is Síva in the form of Vishnu the Preserver; he has here his unfailing mark, a full-blown lotus, in his right hand. To the right of the bust, again, or to the spectator's left, Síva appears as Rudra, *i. e.* the Destroyer, which is generally considered to be his proper character. He is smiling on a cobra capella, which is twisted round his arm, and with expanded hood looking him full in the face. A swelling on his forehead is his third eye, from which is to burst the flame that will consume at last the world. Among the ornaments of his cap are a death's skull, a leaf of the *nirgudi*, and a branch of the *bilva* tree, all peculiar characteristics of this god. The large figures at the portals are Hindu door-keepers, and they lean, as before, on dwarfs, called by the natives pis'áches, or demons, probably caricatures of the rude aborigines or hill tribes of the country. (See Note A.)

ARDHANARISHVAR, OR HALF MALE HALF FEMALE DIVINITY.

In the first compartment to the right of the central figure, or to the spectator's left, there is an exhibition of Síva (Sheewa) in his character of Ardhanárishvar (Arddanahreeshwur). The right half of the figure is intended to be that of a male, and the left that of a female, and thus to represent Síva as uniting the two sexes in his one person. The first European visitors supposed this figure to be intended for an Amazon, transferring the traditions of Greece to India. No such being is known,

however, to Indian mythology, while such a manifestation of Síva as we have mentioned is described in the Puráns. The bull on which two of the hands of the figure lean, and on which it is supposed to ride, is called Nandi, (Nundee,) is a constant attendant on Síva. Brahmá, on his lotus throne, supported by five swans, and with his four faces, is exhibited on the right of the figure. He has a portion of all these faces visible. On the left, Vishnu is seen riding on what is now a headless Garuda, (Garoor,) a fabulous creature, half man half eagle. Above and in the back-ground are found a number of inferior gods, and sages of the Hindus, which neither our plan nor their importance will allow us to describe. We may mention, however, that Indra, king of the old gods,—those worshipped in ancient times,—appears there mounted on an elephant.

The porters will be found at the door of the compartment, as before. (See Note B.)

SIVA AND PARVATI.

The visitor must now retrace his steps, and, passing the large image, look to the first compartment on its left, or on the west side of the cave, and he will there see two principal figures, intended to represent Síva and Párvati, (Sheewa and Parwuttee,) the former to the right of the latter. From the head of the male figure the Ganges is represented as flowing, and from its centre three heads are seen to issue, representing Ganga, Yamuna, and Sarasvati, the deified rivers,—Ganges proper, Jumna, and Soorsatee of our maps,—which, when united, form the Ganges of the Lower Provinces, and which is fabled by the Hindus to spring from Síva's head. Síva is thus identified with the Himalaya Mountains, whence the Ganges really flows into Hindostan. (See Note C.)

ANALOGIES SUGGESTED BY THESE THREE COMPARTMENTS.

Unusual as it has become in recent times to trace any connection between the Hindu traditions and the Scripture records, I cannot allow myself to proceed without asking how it is possible for any unbiassed mind not to see in the triple figure an effort of the Hindu intellect grasping at that great doctrine, so diffused throughout the world, of an Unity and Trinity in the Deity. No one who studies the subject carefully will maintain that the Hindu and Christian notions on this subject are indentical; and no one who judges without prejudice can fail to see that there is an analogy between them, which is all that any sound theologian would ever think of maintaining. My own idea in respect to the derivation of this Hindu Triad is, that it had no wide-

spread currency in its present form till about the period above mentioned, —the eighth century of our era; that it was copied from the Buddhist Triad of Buddha, Dharma, and Sanga (Intellect, Virtue and Union); that this philosophical Trinity was derived from the ancient Vedic notion of the three sacrificial fires forming one Agni, or God of Fire—a much nearer approach to the Christian idea than the modern system; and that this, again, was connected with the Egyptian and other primeval traditions.

The half-male half-female figure I consider to be the Hindu way of representing the Adam whom God at first created, and from whose side a rib was separated for the formation of Eve. The third compartment under this notion will be an exhibition of Síva and Párvati as the progenitors of mankind, as they are declared to be in some of the Hindu mythological writings.

THE MARRIAGE OF SIVA AND PARVATI.

To the next compartment the visitor must proceed on in the same direction, still farther to the west, till he has passed the chapel first described, and he will see a group representing the marriage of Síva and Párvati; for, following up the analogy above noticed, the Hindu traditions represent Brahmá the Creator as performing the marriage ceremony, and uniting by a solemn rite the primeval male and female—thus giving a divine sanction to the institution of marriage. It is strange that, after the right idea had been suggested both by Pike and Moor, Mr. Erskine should have "perceived nothing to favour the supposition," since in this compartment alone does the female stand to the right of the male, a position a Hindu woman rarely occupies, except at her marriage. Like dining with her husband, it is one of the privileges of the wedding-day. Down in the corner, at the right of the female, is Brahmá, known by his four faces, sitting on his hams, and reading or reciting the sacred texts suited to the occasion. Among the attendants on the same *side* one is represented bearing a vessel, probably supposed to be filled with sugar-plums, and other sweetmeats, as is the custom still in Bombay, and exactly like one I accidentally saw in the streets while writing this paper. Vishnu will be noticed on his man-eagle conveyance on the other side, and in the back-ground a numerous train of inferior gods and goddesses. (See Note D.)

THE BIRTH OF SIVA'S FIRST SON.

The visitor must now retrace his steps a second time, and go to the corresponding compartment in the eastern side of the cave from where

he now is, near the place whence the rubbish was lately cleared away, and the two lions brought to light. There he will again see Síva and Párvati in the fore-ground, and a little behind them, but somewhat nearer to the latter than to the former, he will observe a female with a child, borne astraddle upon her haunch, in the way little children are usually carried in India. The child is Vináyaka, or Ganesha, usually in Bombay called Ganpati, (Gunputtee,) and is Síva's eldest son. The legends about his birth and infancy greatly vary, and it must suffice us here to say, that although at first possessed of a proper human form, as here represented, he had soon the misfortune to lose his head, and, no better substitute being forthcoming, an elephant's was clapped upon his shoulders, which to this day he has been doomed to wear, and with which he is always represented in the compartments yet to be described. Among the group of figures Bhringi, a special favourite and worshipper of Síva, reduced almost to a skeleton, is conspicuous, as also Párvati's tiger, on which she rides when she goes abroad. (See Note E.)

RAVANA UNDER KAILAS.

The visitor must now turn round his face in the opposite direction, and instead of looking southward, look northward, and, after advancing a few paces, he will come directly in front of the sixth compartment. There is here exhibited a group representing Rávana, (Rahwun,) king of Lanka or Ceylon, as well as of all India south of the Nerbudda, under Kailás, the heavenly hill of Síva, while Síva and his attendants are sitting above. Rávana, it will be observed, has ten heads, and, as the legend goes, he had got under the hill for the purpose of carrying it off to Ceylon, and thus keeping Síva all to himself, and protecting himself against Ráma, by whom he was at last slain. Párvati, having in alarm cried out that the hill was shaking, Síva raises up his leg as here represented, and firmly fixes down Rávana between heaven and earth, where he remains ten thousand years, till, taught by his grandfather to propitiate the god, he is at last released; and after which he continues, notwithstanding all his crimes, a devoted worshipper of Síva. Rávana I suppose to be the type of the rude aborigines who inhabited India before the Brahmans and high caste Hindus from the north invaded the country. The moral taught in this compartment, then, is Síva's power over these rude aborigines, and their devotion to his worship.

DAKSHA'S SACRIFICE DESTROYED.

To follow out the theory of the cave systematically, it is necessary for the visitor once more to cross to the opposite side, and, passing the

Linga Chapel, place himself before the corresponding compartment on the west. The legend referred to in this sculpture is one very famous in Hindu mythology. It is represented at Ellora twice, and once or twice in the caves near Amboli, in Salsette. Daksha, (Duksh,) the patriarch of the high caste Hindus, had begun to perform a sacrifice, according to the ancient Vedic ritual, and to which all the gods that should be worshipped according to the Vedas were invited. Síva and his wife did not belong to that number, and of course were not asked to attend. At this the lady took sore offence, and excited her husband to assume the form of Víra Bhadra, (Veer Buddra,) here occupying the principal place in the tableaux, for the purpose of spoiling the sacrifice, and dispersing the attendants. One of the hands of the god has seized Daksha's coronal tuft of hair, another is holding a vessel to catch his blood, and a third is wielding an immense sword, with which he is about to cut off his head. The head was hacked to pieces and burnt, and when Síva's wrath was afterwards appeased, the goat or ram's head that had been sacrificed was made to supply its place, thus keeping him ever mindful of the might of Síva, and of the offence he had committed against it.

The rest of the gods, among whom Indra, sitting on his elephant, is conspicuous, seem petrified with terror, but whether the word went forth *sauve qui peut*, or whether they stood forward and manfully fought it out, cannot from the variation in our authorities be determined. All agree, however, that in the end they were reconciled to Síva, and worshipped him as the supreme god. There is a remarkable bottle-shaped figure above the principal image, around which the sages are seated in adoration. This is a Ling, the emblem of the worship of Síva, at this time fully established. It has on it a circular figure, which may perhaps be regarded as the mystic *Om*, the emblem of the Triad, and compounded, as the Brahmans tell us, of *A*, *U*, and *M*, the emblems of the three great gods respectively, and which the French would pronounce exactly as the Hindus do, for *Om* is pronounced like the French *Adme*.

The legend referred to in this tableaux scarcely conceals that there was at the time mentioned a contest between the followers of the ancient Brahmanical ritual and the adherents of the new system, in which Síva, a god borrowed from the superstition of the aboriginal Hindus, the worship of the Ling, and other heterogeneous elements, were introduced,—a system essentially the same as the current Saiva Hinduism. This group, then, marks the putting down of the Vedic Brahmanism, and the substitution of Saivaism, and the worship of the Ling, in its room.

BHAIRAVA.

The visitor, proceeding outward towards the entrance of the cave, arrives at another compartment, still on the same side. Síva is here represented in his character of Bhairava, a form he took to put down the extravagant pretensions of the sectaries of Vishnu. In Southern India the Narsinha, (Nursing,) or man-lion, of the same form nearly as the Egyptian Sphynx, is one of the forms under which Vishnu is worshipped. Bhairava was created to put down the boasting of this incarnation of Vishnu, who maintained that he was superior to Síva. Ganpati and other attendants are here sculptured, but there is no appearance of actual warfare. This is, perhaps, intentional. The artist thought it sufficient to exhibit the god in this form to assert his supremacy, without irritating the numerous worshippers of Vishnu as the supreme deity, by any humiliating mark of inferiority. Such caution was not necessary in the last described compartment, as all natives on this side of India, and I believe everywhere else, maintain the supremacy of either Vishnu or Síva.

SIVA AS A RELIGIOUS ASCETIC.

Turning round, and advancing a little, the visitor comes in front of the last group, in which Síva is exhibited as a religious ascetic. Asceticism is the highest form of all the different systems of Hinduism. None of them promise union with deity to any, as a general rule, except to ascetics. As such a one Síva is here represented,—as a Yogí, which is the name the Brahmans give to a Saiva ascetic of the highest order. The Gosains, who go about our streets covered with ashes, belong to an inferior sect. This is the figure supposed to represent Buddha by the earlier visitors, an explanation of it against which Mr. Erskine has given very good reasons. Nevertheless, it is not improbable that the Saiva asceticism, with its monastic establishments, and the yellow garments of those that are clothed, has been borrowed from Buddhism. Though this figure, then, were an image of Buddha, it would be Síva as Buddha, Síva the sage, the possessor of every attribute that can inspire reverential awe. Among the ten avatárs of Vishnu there is one called the Bauddha, evidently a caricature of Buddhism, and there is no reason why Buddha might not have been made an avatár of Síva the Mahayogí.

SUPPLEMENTARY EXCAVATIONS.

There is a small excavation in the face of the hill to the west, just opposite to the Ling Chapel first described, dedicated to Ganesha,

(Gunputtee). He himself, easily recognized by his elephant head and pot-belly, is seated at the southern extremity, and the company, of which he is the leader, is ranged along the western wall of the small excavation. On going out by the eastern opening, the visitor finds a stair with a few steps, on each side of which is a sculptured lion, leading to a small Ling Chapel, on which are no figures. On going round the hill a little way to the south, two other excavations close to one another are found, fronting the east. They too are Ling Chapels, with a few sculptures outside, representing door-keepers, &c. such as before described. On the hill opposite to that out of which the Great Cave has been excavated, an excavation has been commenced, but the work seems to have been stopped before any material progress had been made.

CONCLUSION.

The Great Elephanta Cave, then, contains a representation of the chief objects of Saiva worship, and of some of the great events that took place on the establishment of that form of Hinduism. The five tableaux on the southern wall, as we have shown, point to traditions that are in a great measure common to all the ancient nations that attained to any degree of civilization; and the following three mark so many great struggles that took place in the establishment of the present system of Saiva Hinduism; while the last points to the quiet that succeeded these conflicts, by the supremacy of the system which is fitly enough exhibited by representing Síva in the peaceful character of a religious ascetic.

NOTES.

A.

The idea of the principal figure in the Elephanta Caves being Síva, in the character of Brahmá, Vishnu, and Rudra, is mentioned by Mr. Erskine as having been suggested to him by a learned friend. Who the learned antiquarian referred to was I do not know; but though this theory was set aside by Mr. Erskine, from erroneously supposing it inconsistent with the unity of design manifested in the sculptures of the cave, it is doubtless the true one, as the following considerations will show.

In looking about for illustrations of the Elephanta Caves in the existing body of Hindu sacred literature, I found that the legends sculptured are all, with a single unimportant exception, to be met with in the Linga Purána, and follow it, even when they are differently narrated, in others of those compilations of Hindu traditions. This Purána

advocates the Smartta theory, which Colonel Kennedy has explained to differ from the Saiva in this—that whereas the latter allows of no worship to be paid to Vishnu, the former, while maintaining the supremacy of Śiva above all the other gods, yet directs them also to be worshipped in subordination to him; just as the Bhágavata ascribes supremacy to Vishnu, while admitting other gods to a share in divine honours, and thus differs from the exclusive Vaishnava theory. In reference to the three-faced bust of Elephanta, the very first line in the Linga Purána illustrates it. It is नमो रुद्राय हरये ब्रह्मणे परमात्मने. "Adored be Rudra, Hari, and Bramhá, the Supreme Spirit." After finishing the table of contents, we have, in the commencement of 11th Adhyáya, a brief account of the manifestation of Síva as Purusha and Prakriti (the former and thing formed); and then of the Linga as one, seven, eight, and eleven; and in the 6th Shloka we have the following important statement:—

तेभ्यः प्रधान देवानां त्रयमासी त्त्रिधात्मकं॥
एकस्मात्त्रिध्वभू द्विश्व मेकेन परिरक्षितं॥
एकेनैव हृतंविश्वं व्याप्तं त्वेकं त्रिधेनतु॥

"After these the chief of all the gods, the Triad manifestation of Síva, was produced. The world sprung from one of these three, by another it is preserved, and by a third it is destroyed, and the whole world is pervaded by this one Síva." Nothing can be plainer than this. Besides, it is to be borne in mind that among the Maráthas of the present day there is an object of adoration called Dattátreya, affirmed by all of multitudes of learned and unlearned Hindus I have asked, and these are not a few, to be an incarnation of the three gods, Brahmá, Vishnu, and Síva. In ordering while at Poona from a native artist a set of all the objects of divine worship in the place, without any particular directions given, he brought me one of this god with three faces, and one full length figure. I showed also the picture of the Elephanta bust, given in the first volume of the Literary Transactions, the other day, to a Poona Brahman, who had never seen the caves, nor heard the sentiments of Europeans on the subject of them, and he said, after looking at it, that it was a figure of Síva. I then replied, Síva in what form,—has Síva not got five faces? He seemed then a little taken aback, and, after examining the figure more minutely, he said it probably was Síva as an incarnation of the three principal gods, Brahmá, Vishnu, and Rudra. The sentiments, then, of the natives on this side of India, are quite in unison with the idea I have expressed, whatever may be those entertained by the natives of Bengal and Upper

India. What is especially to be noted in this theory is, that Síva is, properly speaking, the eternal deity,—or, as he is termed in our Puráná, the Paramátmá,—and that the three by whom the operations of the world are carried on are Brahmá, Vishnu, and Rudra—Rudra being distinguished from Síva. Colonel Sykes, after examining carefully the Trimurtis in the hill at Ellora, concludes that one member of the Triad is a female. I do not think this can be the case with the Elephanta Triad, but I see no necessity for those at Ellora being busts of the same form of the divinity. The Ellora busts may represent Síva, Párvati, and Vishnu, although in reference to this I speak only hypothetically, not having found anything in the Puránas or popular traditions to support such a theory. In appearance, they certainly differ considerably from the figures at Elephanta. The union of which Párvati is a member is usually indeed a double one, such as is described in the next compartment,—still such a union could subsist, theoretically at least, without running in anything counter to the Smartta system of Hinduism.

B.

The Ardhanáríshvar is well known to the students of Hindu antiquities, and no illustration of it is needed; yet the following passage from the Linga Purána on the subject may be interesting—it is from the 5th Adhyáya of the first part:—

पुत्रीकृता सती या सा मानसी शिवसंभवा ॥
दक्षेण जगतां धात्री रुद्रमेवा स्थिता पतीं ॥
अर्द्धनारीश्वरं दृष्ट्वा सर्गादौ कनकांडजः ॥
विभस्वेतीचाहादौ यदाजाता शुभा ॥
तस्याश्चैवां शजाः सर्वास्त्रिया स्त्रिभुवने तथा ॥
एकादशाविध रुद्रास्तस्यचां शौद्भवा स्तथा ॥
स्त्रिलिंगमाखिलं सावै पुल्लिंग नील लोहितः ॥

"Daksha, having produced his mental daughter Satí, adapted for Síva, applied her to the Lord Rudra. At the beginning of the multiplication of creatures, (Brahmá,) sprung from the golden egg, said to this (Ardhanáríshvar) half-male half-female divinity—'Divide thyself': then she sprang forth a fair female, and as portions of her all the females in the three worlds have been produced in succession; and from the male sprang as portions of him the eleven Rudras, and so on. She was entirely a female, and he entirely a male."

C.

The last portion of the above quotation illustrates the subject of the third compartment,—the separated Síva and Párvati.

D.

The legend of the marriage of Síva is given in the 98th Adhyáya of the Linga Puráṇa. That Brahmá Deva was the officiating priest the following words distinctly show:—

ततः प्रनम्य हृष्टात्मा ब्रह्मलोक पिता महः॥
हस्त देवस्य देव्याश्च ययोज परमप्रभुः॥

"Then bowing reverentially, and rejoicing in spirit, the great father of Brahmáloka, the supreme lord, joined the hands of the god and goddess." During some religious rites, as well as at marriages, the wife appears on the husband's right, yet there can be no reasonable doubt that this is the marriage I have mentioned.

E.

The next Adhyáya, the 99th, contains the account of the production of Vináyaka, or Ganesha, and this is the main reason that I have fixed on him, rather than on Kártikeya, as the child here represented. He afterwards also acts a more important part, and much more is said about him than about his brother, who is not mentioned till afterwards. The story generally current among the Hindus here, that Ganesha was formed of the scurf of Párvati's skin, is not adopted in this Puráṇa; he is brought forth at once by the power of Síva, or rather is a manifestation of Síva, as the following line shows:—

ततस्तदा निशम्यैवं पिनाकधृक् सुरेश्वरो गणेश्वरं सुरेश्वरं वपुर्दधारसः

F.

The legend of Rávana's attempting to carry off Kailás is the only one illustrative of the Elephanta sculptures that I have not met with in the Linga Puráṇa. It is so generally known, however, and the subject so unquestionably refers to this mythological history, that the want is of no consequence.

G.

The legend of Daksha, taken from the Váya Puráṇa, is translated by Professor Wilson in his Vishnu Puráṇa. The Linga is still more severe upon the gods. There is, according to it, a regular stand-up fight, and not even Vishnu escapes with his life. At the intercession of Brahmá, however, who was not in the fray, and comes in at the end as a mediator, Síva restores them to life, when they all become his reverential worshippers. The account of this transaction is in the 95th Adhyáya. This legend brings also before us the important fact that

Brahmá was not a Vedic god, though, as the deified Prajapati, or Brahman patriarch in after times, he is artfully supposed here to come in and intercede for the other gods.

H.

Before meeting with the account of the production of Bhairava, contained in the 91st Adhyáya of the Linga, I never understood rightly the relation in which Víra Bhadra and Bhairava stood to one another, or what were their peculiar offices. It appears, then, that the former was a special manifestation of Síva, for the purpose of humbling the followers of the ancient Vedic worship; and the latter to bring down the pride of the modern Vaishnavas, and their avatárs of Vishnu. As I have not seen this idea referred to by Europeans, I give a portion of the account as it stands in the original. The conflict is said to have been maintained with Narsinha, who, after his victory over Hiranyakasípu, became quite overbearing, and insufferable in his insolence to gods and men. The divinities, accordingly, with Brahmá at their head, supplicated aid of Síva. The narrative then proceeds as follows:—

एवमभ्यर्थितो देवैर्मत्तिं चक्रे कृपालयः ॥
यत्तेजसा नृसिंहाख्यं संहर्त्तुं परमेश्वरः ॥
तदर्थं स्मृतवान् रुद्रो वीरभद्रं महाबलं ॥
आत्मनो भैरवंरूपं महाप्रलयकारकं ॥
आजगाम पुरासद्यो गणानाम ग्रतो हसन् ॥
सदृग्हासैर्गणवरै रुत्पतद्भि रितस्ततः ॥

"Being thus entreated by the gods, he mercifully formed his plan; and the supreme lord Rudra, that he might encircle himself with the radiance necessary to slay him who is called the man-lion, meditated upon the mighty Víra Bhadra, and caused to proceed from himself the form of Bhairava, which will one day destroy the world. Smiling, he sprang now, as formerly, to the front of the band of clotted-haired grinning heroes, that were produced along with him."

We have, then, two or three speeches of defiance in the Homeric style, when Bhairava assumes the form of the bird Sarabha, and over and over again lifts the helpless Narsinha up in the air, and dashes him down on a rock, till he cries peccavi, and नमो रुद्राय.

I.

In illustration of the compartment where Síva is represented as a Mahayogí, the whole of the 22nd Adhyáya of this Purán is important. It is a section, which describes prophetically the spiritual worship of

Síva, and the ascetic forms he assumes in all the twenty-eight Manwantâras, when seated amid his four sons, forming a group like the five Dhyáni Buddhas, he spends his time in mental contemplation. Síva, it is said, will in the ninth Manwantara be called Rishaba;—now Rishaba was a Hindu ascetic king, whom the Jains claim as their first Tirthankara. In the tenth, it is said, he will be a Muni, seated on the top of the Himalayas. In the fourteenth, it is said, he will be called Gautama, and sit in the Gautama Vana. Gautama is both the name of a Hindu sage, and of the last Buddha, but the attitude and place lead us to think of the latter rather than of the former, though the author probably wished his readers to understand the Brahman Gautama. In the eighteenth, he will be called Sikhandi, *i. e.* "feather-crested," whence a sect of Gosains derive their peculiar badge. In the twelfth, he is to be called Atri, and cover himself with ashes, as a large sect of Gosains do. In the seventeenth, he is to be called Guhavási, *i. e.* "inhabitant of the cave," and to sit in a cave of the Himalaya Mountains. It might be hazardous to affirm that the sculptor had this last form of Síva especially in his mind. I am rather inclined to believe that he intended to give a general figure, which might stand for Síva in any of the ascetic forms he had assumed in different eras; but that the intention was to represent Síva as a Yogí I think cannot admit of even the shadow of a doubt. It agrees with the general conception that runs throughout the whole, and I cannot conceive how any one can seek an explanation different from that which the chapter of the Purána referred to suggests.

ART. V.—*Brief Memorial of the Literary Researches of the late* WILLIAM ERSKINE, *Esq.* By JOHN WILSON, D.D., F.R.S., Honorary President of the Bombay Branch Royal Asiatic Society.

Presented, July 15, 1852.

MR. ERSKINE came to Bombay with Sir James Mackintosh in 1804. "I had the good fortune," says that acute judge and exquisite critic of human character and culture, "to bring out with me a young Scotch gentleman, Mr. Erskine, who is one of the most amiable, ingenious, and accurately informed men in the world." "My philosophical friend Erskine," was the designation which he not unfrequently gave him in his conversation and correspondence. In 1809, this admired friend of Sir James became his respected son-in-law.

In 1808, Mr. Erskine was appointed Clerk to the Court of Small Causes, a division of the Recorder's Court over which Sir James Mackintosh presided. For many years he was one of the Magistrates of the island. In 1820, he was nominated Master in Equity by Sir W. D. Evans. During the nineteen years he was in Bombay, he enjoyed the highest character for ability, learning, integrity, and honour. When, in consequence of the failure of his health, and his removal from his offices in the Court, he left India in 1823, he was thus addressed by between sixty and seventy gentlemen, forming the body of the European Society of Bombay :—"Few of us have had the happiness of your acquaintance during the whole period of nineteen years that you have resided here. But early intimacy, or the report of our predecessors, impressed all of us with such an estimation of your character, as inspired our respect and esteem ; and which subsequent intercourse has to the last moment increased and confirmed. In public life we have observed you perform the arduous duties of various important situations with the most conciliating address, the greatest ability, the strictest integrity, and the most benevolent but impartial justice. In private life, we have been delighted with the most engaging urbanity, the correctest feelings of a gentleman, the nicest principles of honour, and the loftiest sentiments

of disinterestedness. In literary pursuits, your animating example diffused a love of literature, and your intimate acquaintance with the learning of the West and the East enabled you to communicate that information which might have been elsewhere sought in vain, and to confer, not only on many of us, but on others, the important benefit of your advice in the direction and amelioration of our pursuits and studies." Mr. Erskine took a large share in the management of some of the philanthropic institutions of Bombay. Some of the early reports of our Bible Society are from his pen. It is due to him to say, that he was the first advocate of such charity schools as those of the Bombay Education Society now in Byculla, as is evident from his correspondence in one of the documents now referred to.

But it is principally in connexion with this Society that at present we have to do with Mr. Erskine. He was one of its most distinguished founders. He was present at the meeting of seventeen gentlemen held in Government House, Parell, on the 26th November 1804, when, on the proposal of Sir James Mackintosh, it was constituted under its original designation of THE LITERARY SOCIETY OF BOMBAY; and he was then appointed to the office of Secretary, on the efficient discharge of the duties of which the prosperity and advancement of the institution was greatly dependent. He was the last survivor of the twenty-eight members who were enrolled at its first meeting. He held the office of Vice-President for some years before he left India. On that occasion, a letter of thanks was, on the motion of the then President, the Honorable Mountstuart Elphinstone, seconded by Archdeacon Barnes, addressed to him, which, as it has not yet appeared in any of the publications of the Society, or its English consociate, the Royal Asiatic Society of Great Britain and Ireland, may be here introduced:—

"SIR,—Your unexpected return to your native country has prevented the Literary Society of Bombay from expressing to you, previous to your departure, the high sense that it entertains of the important benefits which you have conferred on it. One of the original members by whom it was instituted in 1804, you became the Secretary; and it is to your unremitting and judicious exertions in that situation to which the formation and prosperity of the Society must be principally attributed. The kindness, also, with which you have assisted in preparing its Transactions for the press, and in contributing to them papers so distinguished by their learning, research, and elegance of style, have given to that work an interest and a value which it would not otherwise have possessed. But not in these respects alone has your influence

proved beneficial to literature; for your intimate acquaintance with classical, modern, and Oriental literature, your sound judgment, and your correct and cultivated taste, have enabled you to afford to others that information which is so often requisite in this country, and to point out to them the studies and pursuits to which their attention might be most advantageously directed. The readiness, at the same time, and indulgence with which such assistance has always been given, can be only equalled by the unassuming manner and the urbanity with which opinions the most instructive were invariably communicated.

"That the loss of a person possessed of such eminent qualifications and abilities can ever be replaced is scarcely to be expected. But the regret which the Society experiences on this occasion is diminished by the hope that the interests of literature will be materially promoted by your now being relieved from the interruptions of official business. That your constitution may re-invigorate by your return to your native country, and that you may enjoy undisturbed happiness for many years in the bosom of your family, and in the solace of literary pursuits, are the sincere wishes of a Society by whom you will ever be remembered with sentiments of the truest respect and esteem."

This letter was from the pen of Captain (afterwards Major-General) Vans Kennedy, who well weighed his words in complimentary addresses.

The first paper laid before the Society by Mr. Erskine was entitled—"Observations on two Sepulchral Urns found at Bushire, in Persia." It was read on the 6th July 1813. The antiquities of which it treats had been forwarded to him in Bombay by Mr. Bruce, the Resident in the Persian Gulf. They were of the cylindrical form, of which many examples have since been found both in Persia and its confines. Mr. Erskine, after showing by quotations from Herodotus, Strabo, and Sextus Empiricus, that the ancient Persians did not universally follow the mode of sepulture in *dakhmas*, or "towers of silence," as they have been of late denominated, now in use among the Zoroastrians, came to the following conclusion:—"It seems not improbable that the urns found at Bushire contain the remains of two ancient Persian fire-worshippers; the bones were probably those of poor people, who used an urn of baked clay, as a cheap and effectual method of excluding the elements; and the bones were not probably deposited in them till they had been blanched and purified by the exposure of the corpse to the air, and to birds and beasts of prey." Questions relative to the disposal of the dead in olden times have their principal interest, and that is frequently of no unimportant a character, in the light which they throw on the ancient ethnography and religions of the world.

Mr. Erskine's second paper, laid before the Society also in 1813, was that for which he is best known to the public in India—the "Account of the Cave-Temple of Elephanta." It is one of a remarkably interesting character. It is correct and minute, without being tedious; and its individual descriptions are associated with general and important deductions, illustrative of the Hindu religion and mythology, the state of the arts at the time the temple was excavated, and the manners and customs of the inhabitants of India. It bears ample evidence to the accuracy and refinement of the author's taste and judgment, and to the caution of his research as an Oriental antiquarian. Like Niebuhr, and some other writers who had preceded him, he associated the excavations solely with the *Shaiva* form of the Hindu religion. No corrections of any consequence have been made of his general or specific interpretations of their varied arrangements and multitudinous figures, though the theory which he mentions as that of one of his friends, that "the temple might be dedicated to *Shiva* [as in the case of the *Trimúrti*] with the attributes of *Brahmá* and *Vishnu* [superadded]," is that which will now be assented to by all competent judges. All doubt on this subject was set at rest by Professor H. H. Wilson, in the *Quarterly Oriental Magazine* for 1824. Such of the Hindu *Puránas*, indeed, as are devoted to *Shiva*,—the *Matsya*, *Kaurma*, *Lainga*, *Shaiva*, *Skanda*, and *Agneya*, —all absorb the attributes of *Brahmá* and *Vishnu* in their favourite deity; while in the spirit of the violent sectarianism by which modern Hinduism is characterized, those devoted to *Vishnu*, and partially those devoted to *Brahmá*, make a similar usurpation for the objects of their admiration. In *Shiva* himself, independently of this circumstance, several distinct gods have been combined by the Bráhmans, in deference to him as the "Great God," *Mahádeva*, a popular divinity, originally unknown to their pantheon, as well shown by Professor Lassen in his invaluable work on Indian archæology. His worship under the form of the *Linga*, or *Phallus*, as hinted at by Mr. Erskine, originated in the south of India. It is rather remarkable that Mr. Erskine's estimate of the age of the Elephanta temple, though founded on more restricted data than those now possessed, is likely to prove nearly correct.

Mr. Erskine's third paper, "On the Sacred Books and Religion of the Pársís," was laid before the Society in 1819. He takes a rapid view in it of what was then known of the ancient languages of Persia; examines the comparative value and authenticity of the details of ancient Persian history, as contained in the writers of Greece and Rome on the one hand, and of Persia on the other; gives a short sketch of

the tenets of the modern Pársís, and the works ascribed to Zoroaster, on which they are founded; and briefly indicates the proofs of the antiquity of many of their particular doctrines and observances. The contribution is an admirable one; and it must be admitted to be extremely creditable to the research and observation of the author, especially when the restricted nature of our, now excellent, Bombay library at the time when it was composed is taken into consideration. It forms an important document in the history of the investigation of the literature and religion of the ancient Ariana. According to the views which it advocates, the Zend language is of Indian origin, and the Persian liturgy of no higher antiquity than the age of the Sasánís. But these views the philological labours of Bopp, Burnouf, Lassen, and others, ultimately led him to change. In a letter, addressed to the writer of this imperfect memorial, dated the 14th November 1843, he expresses his strong approbation of the general views both of the Zend language and religion which are contained in his larger work on "The Pársí Religion," remarking of the most important matters on which we had differed, "you are no doubt right." However, one of his most important theses on the Zend language, that it is not the *parent* of the present Persian, can easily now be established. The inscriptions of the Achæmenian Kings at Besitun, so ably deciphered and interpreted by Colonel Rawlinson, and Professor Westergaard, reveal to us the true parent of the Persian, which is not Zend, though a cognate tongue. The Zend, as will soon be publicly shown by Westergaard, was in its two dialects the language of Soghdia and Bactria. The greater portion of its literary fragments transcend the times of the Achæmenides, and are devoted to a rude and peculiar state of society, bordering perhaps on the reign of Dejoces. Whether Zoroaster was a historical, or merely a mythological personage, is not yet certainly known. Mr. Erskine well shows the discrepancies which are to be found respecting him in the Greek writers, as well as severely comments on the incongruities which have found currency under his name.

Mr. Erskine's fourth communication to the Society forms an accompaniment to the preceding. It is directed to the disproof of the authenticity and genuineness of two works of high pretension—the *Desátir* and *Dabistán*, brought into notice by some ingenious but unfounded conjectures of the prince and pioneer of British Orientalists in India, Sir William Jones; and it is most thoroughly successful in its adducement of facts and arguments. It displays critical acumen of a high order. It thus concludes:—"From what I have already said,

you will be sufficiently aware what my opinion is regarding both the *Desátir* and the *Dabistán:* you will see that I am not sanguine enough to hope that any gleam of light can be cast from any such quarters over the early history of mankind. You will have discovered that, far from regarding the doctrines of the *Desátir*, and the historical narrative of the *Dabistán*, as resting on *unexceptionable authority*, and as consequently believing that the learning and philosophy of Persia existed some thousand years ago, and produced the science of the Greeks and the Bráhmans; I consider the whole of the peculiar doctrines ascribed to Mahábád and Hoshang as being borrowed from the mystical doctrines of the Persian Sufis, and from the ascetic tenets and practices of the Yogis and Sányáshis of India, who drew many of their opinions from the Vedántí school. I regard them as having had no existence before the time of Azer-Keiwán and his disciples, in the reigns of Akbár and Jehángír, and as having been devised and reduced into form between 200 and 300 years ago, in the school of the Sipásí philosophers. The language of the *Desátir* I regard as one fabricated, with no great address, to support this religious or philosophical imposture, and as at no time having belonged to any tribe or nation on the face of the earth." Since these remarks were penned, no more has been heard of the *Desátir*, except as a cunningly devised, though clumsily executed, literary forgery. The *Dabistán*, as illustrative of the professions and speculations of its dreamy authors, has yet some relative interest.

Mr. Erskine's last communication to the Society is entitled "Observations on the Remains of the Buddhists in India." It treats of the comparative antiquity of the Buddhists, Jainas, and Bráhmans,—justly giving the palm to the latter, from whom the Buddhists are dissenters, while the Jainas are dissenters from the Buddhists; of the tests by which their respective religious excavations may be distinguished; and of the actual remains of the Buddhists in India, as far as they were known in 1821. There is much condensation in it of information elsewhere scattered over an extended surface. It conveyed to the reader, too, much novel intelligence at the time it appeared. Like all that proceeded from the pen of the author, it is both sound and substantial.

In 1826, Mr. Erskine published the autobiography of the Emperor Baber, translated by the late learned Dr. John Leyden and himself from the Jaghatai Turkí, so little known to Europeans, though one of the most powerful and refined languages, as far as natural description is concerned, which is spoken in Asia. Of the most valuable and ably written historical and geographical introduction to this most curious and important work, as well of the numerous illustrative notes and

supplements which are attached to it, he was the sole author. It cost him an immensity of labour in Bombay, where it was prepared, and great editorial care, when he carried it through the press in Edinburgh. It is one of the most precious literary contributions which the East has given to the West in modern times. Baber united in his extraordinary character the general, the statesman, the poet, and the scholar, though with certain failings and faults, not much to be wondered at when his religious education, his eventful times, the depravity of many of the parties with whom he came in contact, and the remarkable scenes of his varied actions, both as a fugitive and a conqueror, are adverted to; and his journal, though it occasionally notices matters neither of personal nor general interest, throws a flood of light on the peculiar habits and conduct "of the founder of a new dynasty, in one of the richest and most powerful empires on earth," and the natural and social state of the various countries, particularly India, which he visited in the progress of his extensive military operations and civil administration. "Perhaps no work ever composed," as remarked by Mr. Erskine himself, "introduces us so completely to the Court and Council, the public and private life, of an Eastern Sultan." It is not at all improbable that had not Mr. Erskine, with marvellous zeal and application, followed up the labours on it of his early companion in study Dr. Leyden, it would have remained to this day unknown to Europeans. It is now so much and justly valued, that it is with difficulty that a copy of it can be procured. The estimate formed of Baber's character by Mr. Erskine, and which he sums up in chaste and classical style, has been assented to by all subsequent writers on Indian history.

Mr. Erskine joined the Royal Asiatic Society, on its foundation, after he had proceeded to Europe. He became, also, a member of the Committee of the Oriental Translation Fund. To these institutions, however, he made no contributions. Several articles on India, which appeared in some of the home periodicals, were attributed to his pen.

Mr. Erskine spent the last years of his life principally in Edinburgh, and at Bonn, on the Rhine. They were devoted to studies quite congenial with his former literary occupations—to the elucidation, from original sources, of the early Muhammadan history of India; but though he was on the verge of his eightieth year when he died, he was not spared to lay the results of them before the public. The intelligence of his death, on the 28th May, arrived in India by the last mail. It may be safely said of him, without detracting from the meritorious services of others, that this Society owes as much to his exertions,

as one of its most active office-bearers and learned contributors, as to those of any other of its members. None of his early contemporaries in India, known to the literary world, now remain. Many of them were men of distinction, who will not soon be forgotten. Sir James Mackintosh, though he never entered deeply into Oriental research, was, perhaps, next to Jeffrey, the most accomplished critic of the day, a proficient in mental and ethical science, and one of the richest and most eloquent of writers and speakers. Jonathan Duncan, the Governor of Bombay, in spite of his "Brahmanized mind,"—facetiously alluded to by Sir James,—never lost the happy sympathies of the West, as well evinced by his zealous exertions for the abolition of infanticide. He was an excellent Persian and Hindustáni scholar, intimately acquainted with the manners and customs of the natives, and gave some short communications to the Bengal Asiatic Society before he came to our Presidency. Lord Valentia and Mr. Salt established a high character for their extensive travels, voyages, and researches in India, Abyssinia, and Egypt; and to them we ourselves are indebted for our first respectable and trustworthy notices of the excavations of Kárlá and Salsette. Dr. Helenus Scott, a member of the Medical Board, is not unknown to chemical science. Colonel Boden became the founder of the Sanskrit Professorship in Oxford, which is so effectually revealing the ancient literature and history of India to England. Dr. Robert Drummond published grammars of the Malabár, and Maráthí and Gujarátí languages, from which important gleanings may yet be made by the best of our local philologists. Major Edward Moore published an interesting history of Lieutenant Little's Detachment, a work on Hindu Infanticide, Oriental Gleanings, and the well-known work on the Hindu Pantheon, which, notwithstanding its "Duncanese style,"—for so the compositions of its author have been characterized,—can scarcely now be procured for its original price of five guineas. Sir Jasper Nicholls was our first writer on the meteorology of Bombay. Mr. Francis Wrede and Lieut. Frissell were among the earliest contributors to the Society, the latter furnishing a curious article on Persian ethics. Mr. Robert Steuart, a respectable antiquarian, was one of the first writers on the Saurashtrian coins. Colonel Alexander Walker's reports on Infanticide and the various districts of Káthiáwar, which were "settled" by him, are among the most interesting documents connected with the public services in India. Major David Price's works on Muhammadan history, and other Oriental matters, are standard authorities. It was in the view of the services rendered to Oriental literature by these distinguished men, that the address was presented to Mr. Erskine on his leaving India which has been already quoted. This may show to us, their successors of

what, adverting to the changes of Indian Society, may be denominated the third generation,—for our Malcolms, and Kennedys, and Elphinstones, and Sykeses, and Briggses, and Romers, intervene between their day and ours,—the peculiar value of Mr. Erskine's services and labours. Let us feel and do justice to the encouragement and stimulus of his worthy example.

ART. VI.—*The late Professor* EUGENE BURNOUF, *of Paris, and his Oriental Publications.*

THIS most distinguished Orientalist, an Honorary Member of our Society, a most valued correspondent of most of our Eastern scholars, and the instructor of them all by his great and important works, died at Paris, on the 29th of May last. Asia, as well as Europe, mourns his loss. We have a melancholy satisfaction in transferring the following notices of him and his various publications to the pages of our Journal, from *Le Moniteur Officiel des Etablissements Français dans l'Inde* :—

"MONSIEUR LE REDACTEUR,—Sous le titre de *Nécrologie* et à la date du 29 mai dernier, le numéro du *Siècle* du 30 du même mois contient ce qui suit:

"'L'Académie des inscriptions et belles-lettres vient de faire une nouvelle et grande perte. M. Eugène Burnouf, que ses collegues avaient, il y a peu de jours, appelé à remplacer dans les fonctions de secrétaire perpetuel M. Walckenaër, mort tout recemment, est décédé hier à la suite d'une longue et cruelle maladie, âgé de 50 ans à peine. Fils d'un philosophe éminent que l'Académie a compté aussi parmi ses membres, Eugène Burnouf s'était depuis longtemps placé, par de nombreux travaux et de remarquables découvertes, au premier rang des orientalistes. Il était professeur de langue et de littérature sanskrites au Collége de France, et inspecteur général de l'enseignement supérieur. En apprenant la triste nouvelle de sa mort, sur la proposition de M. Guizot, l'Académie, qui tenait sa séance hebdomadaire, s'est immédiatement séparée.'

"Le seul journal français publié dans l'Inde, pays qui n'a cessé d'être, pendant toute la vie de M. Eugène Burnouf, l'objet de ses predilections et de ses investigations devouées, ne pouvait passer sous silence un si douloureux evènement. Permettez-moi de le signaler comme ayant sans doute échappé à votre connaissance, et d'ajouter quelques lignes à celles que je viens de citer. M. Eugène Burnouf, d'ailleurs, était non seulement, comme Silvestre de Sacy, Champollion le jeune, et Abel Remusat, une des gloires intellectuelles de la France, une illustration unanimement saluée partout où ont pénétré les études philologiques et asiatiques; mais en outre, il n'était pas tout a fait un étranger pour Pondichery: plus d'un, parmi nous, a eu l'honneur, a diverses époques et a differents titres, de l'approcher et de le connaître, et c'est l'un motif

de plus pour que son indigne élève ose venir appeler un instant sur sa mémoire l'attention de vos lecteurs.

"Je ne saurais mieux faire connaître la portée, l'esprit general et le developpement successif des trauvaux considérables de M. Eugène Burnouf qu'en reproduisant, de l'article *Orientalistes* inséré en 1842 dans l'*Encyclopédie nouvelle*, les passages ci-après, ecrits, j'ai tout lieu de le croire, sur ses indications mêmes :

"' Elève de Chézy, il étudia le sanskrit, et après avoir appris cette langue, il voulut savoir ce qu'elle était dans le temps et dans l'espace ; il étudia alors le pali, et se convainquit que cet idiôme, cultivé a Ceylan et dans l'Indo-Chine, etait un italien du sanskrit, et que par suite le pali avait été porté de l'Inde dans l'Indo-Chine, et cela lors de l'invasion du Buddhisme dans ce pays. Puis, après avoir constaté l'antériorité du sanskrit sur les langues parlées a l'est de l'Hindoustan, il rechercha si le sanskrit etait également posterieur ou bien anterieur aux langues parlées au nord-ouest de l'Hindoustan, dans ces vieilles contrées de l'Arie et de la Bactriane. Le resultat de ces recherches fut que le zend, la langue antique de l'Asie, est congenère du sanskrit classique, mais plus ancien ; que le sanskrit presente déja de nombreuses traces d'une culture plus avancée ; que le zend lui-même présente aussi, en moins grande quantité, il est vrai, quelques alterations, que des lors on doit les regarder comme deux langues derivant d'une même source, inconnue et sans doute perdue à jamais. Un autre résultat de ces recherches philologiques fut la publication du *Commentaire sur le Yaçna*, et la création de l'étude de la langue zende. Il devint dès lors constaté que le plateau arien avait été le point de départ de deux courants : l'un arien-brahmanique, qui a couvert l'Inde et, par le Buddhisme, l'Asie oriental ; l'autre, arien-bactrien, qui a enfanté les diverses civilisations de l'Asie occidentale et de l'Europe. Continuant ses importantes recherches, après avoir constaté ce qu'était le sanskrit dans l'espace, après lui avoir fixé pour théâtre l'Hindoustan, M. Burnouf a voulu savoir ce qu'était, dans le temps, la civilisation dont la langue sanskrite était l'expression. Il a publié alors le *Bhâgavata Purâna*, afin de faire connaître les généalogies (livre IX) qui, comparées avec celles des autres Purânas, et les traditions épiques du Mahâbhârata, donneront les seuls renseignements historiques que l'on puisse vraisemblablement obtenir des livres sanskrits. Puis enfin, après avoir précisé la question sur le sanskrit et le vrai rôle de la civilisation hindoue, venue du nord de l'Inde, conquérant le sud de la presqu'île, et débordant sur l'Indo-Chine, il a voulu compléter ses études sur le Buddhisme, c'est à-dire sur le courant religieux de l'Asie orientale.

* * * * *

"' Nous ne craignons pas de dire à l'avance que la publication que prepare en ce moment M. Eugène Burnouf jettera bien des clartés sur cette importante question de l'histoire des religions. Cette publication se compose :

"' 1° D'une traduction du *Lotus de la bonne loi*, contenant plusieurs paraboles d'un caractère presque évangélique sur les principaux dogmes du Buddhisme ; on y voit le Buddhisme triomphant et développé ;

"' 2° D'une analyse des livres qui composent la collection des manuscrits envoyés du Népâl ; plusieurs sont évidemment des premiers temps du Buddhisme, et sont d'autant plus curieux à connaitre qu'ils montrent bien l'origine toute brahmanique du Buddhisme et son caractère de reforme ;

"' 3° Enfin, d'une histoire du Buddhisme.'

"En 1844 parut le premier volume de *l'Introduction à l'histoire du Buddhisme indien :* On y trouve l'exposé le plus complet des origines et des doctrines de cette religion curieuse qu'il soit possible d'obtenir actuellement, en présence de l'immense étendue des écritures sacrées des Buddhists, composées de quelques centaines de volumes in folio. Bientôt après, l'auteur, ne cessant de poursuivre la synthèse de ses savantes recherches, et voulant faire pour le Buddhisme du sud ce qu'il avait fait pour celui du nord, reconnut la nécessité d'entreprendre l'étude de la langue barmane, qui devait lui permettre de contrôler l'ancien texte pali de Buddha par la version moderne. Il a probablement laissé inachevé l'ouvrage ou ce *tour de force* (il considerait ainsi son projet) aurait eu sa place ; et, jusqu'à ce que les connaissances si variées et si larges qu'il reunissait se presentent de nouveau chez un même homme, demeurera ajournée une comparison digne du plus puissant interêt.

"Si la logique et l'esprit de suite qui guidaient les efforts progressifs de l'infatigable professeur sont remarquables, l'importance des resultats obtenus par lui l'est davantage encore. M. Burnouf a, pour ainsi dire, ressuscité la langue zende, complètement perdue avant Anquetil Duperron et a peine entrevue, sous les voiles séculanes qui l'enveloppaient, par le danois Rask, l'homme qui a, dit-on, possédé le plus grand nombre de langues. Il n'existait sur le zend que des ébauches imparfaites et des hypothèses hasardées : Eugène Burnouf le reconstruisit, grammaticalement et analytiquement, au moyen de ses rapports avec le sanskrit et des principes positifs de la philologie comparée. Il eut aussi l'honneur d'être le premier à déterminer l'alphabet cunéiforme, en usage dans les inscriptions indéchiffrées de la Perse et de l'Assyrie. On se rendra compte des fruits réservés à cette nouvelle découverte, si l'on songe aux grands évènements dont les contrées intermédiaires entre la haute Asie, l'Inde, l'Arabie et l'Egypte ont été le théatre pendant une longue période de l'histoire ancienne, à la route qu'ont dû suivre la plupart des migrations orientales, et à l'influence de ces évènements et de ces migrations sur la civilization du monde. M. Burnouf, à travers des difficultés qui pouvaient paraître insurmontables, a tracé la voie où l'ont suivi MM. Rawlinson, Botta, de Saulcy et autres ; il préparait peut-être lui-même un ouvrage critique sur les inscriptions dernièrement apportées de Ninive.

"*L'Essai sur le pali,* publié en 1826, et auquel collabora M. Lassen, de Bonn, a ouvert l'étude des textes du Buddhisme ; l'impression du *Vendidad Sade,* commencée en 1829, et celle du *Commentaire sur le Yaçna,* en 1835, l'étude du zend et de la réligion de Zoroastre ; le *Mémoire sur les inscriptions cunéiformes de Hamadan,* qui date de 1836,

l'étude de l'écriture monumentale de l'antiquité persane et assyrienne. Trois civilisations reculées sont ainsi venues livrer à l'humanité moderne leurs premiers mystères, providentiellement sauvés des abîmes du temps.

"Cette rapide esquisse, ces indications purement fondamentales auxquelles je dois me borner feront apprécier suffisamment, j'en ai l'assurance, la valeur de M. Eugène Burnouf et de ses œuvres, ainsi que la perte irréparable faite en sa personne par la science orientale et le corps de l'enseignement. Ses travaux resteront comme des modèles où la rapidité du coup d'œil, la méthode de l'examen, la netteté des conclusions sont accompagnées d'une conscience pleine d'autorité. Les traductions, pensées par une intelligence maîtresse à la fois d'elle-même et du texte à interpréter, sont aussi belles par leur fidélite et *leur* transparence que par le charme et la supériorité du style. Toutes ces productions sont frappées d'un cachet magistral.

"M. Eugène Burnouf, à côté de sa haute raison, de la profondeur de ses connaissances, avait un esprit pétillant et fin qui, dans le monde et à son cours, rendait sa parole extrêmement pittoresque et attachante. Les arts, surtout la musique, avaient pour lui un grand attrait, et il passait avec un égal amour des méditations austères de son cabinet à l'audition des symphonies de Beethoven exécutées au Conservatoire. Cette souplesse de facultés harmonisées ensemble a souhait m'a souvent paru phénoménale. La bienveillance du caractère de M. Burnouf était parfaite : il a rendu à ses élèves, à ses collègues, à tous, un nombre de services incalculables, et il se montrait toujours étonné des témoignages de reconnaissance des personnes que sa position ou son savoir lui avait permis d'obliger.

"M. Eugène Burnouf avait débuté dans l'enseignement par une chaire de grammaire générale et comparée fondée pour lui à l'Ecole normale. Il était, depuis 1832, professeur de langue et de littérature sanskrites au college de France, membre de l'Académie des inscriptions et belles-lettres, et secrétaire de la Société asiatique de Paris ; il avait remplacé en 1837 M. Silvestre de Sacy comme inspecteur de la typographie orientale à l'imprimerie nationale, et, chargé à ce titre de la direction scientifique du classement et de la fabrication des caractères orientaux et de la révision supérieure des impressions étrangères, il avait fait introduire plusieurs perfectionnements dans nos superbes éditions qu'admire l'Europe ; il était officier de la Légion d'Honneur depuis 1844 ; nommé, en 1848, administrateur du Collége de France et membre de la Commission des hautes études, il ne put accepter la première de ces fonctions. Plusieurs sociétés savantes étrangères s'honoraient de le compter parmi leurs membres. Tout récemment le Président de la République l'avait appélé au rang d'Inspecteur général de l'enseigne-

ment supérieur, et, pendant la maladie à laquelle il à succombé, ses collègues de l'Académie des inscriptions l'avaient choisi pour secrétaire perpétuel. Sur sa tombe sera gravé ce titre inappréciable, qui rappelle les hautes traditions, les grandes renommées de l'érudition française.

"La science à dévoré les jours de celui dont elle avait de bonne heure fait couronner le mérite. Le nom d'Eugène Burnouf ne perira pas: puisse sa nombreuse famille y trouver une consolation.

"Agréez, etc. "ED. ARIEL.

"P. S.—Un ami m'envoie, au moment où je termine, le numéro du *Journal des Debats* qui renferme le compte rendu des obsèques de M. Burnouf. L'hommage des regrets les mieux sémis, de l'admiration la plus vive, et de l'affection la plus vraie, a été déposé au bord de la fosse, au milieu d'un nombreux et imposant cortége, qui montrait assez combien la perte faite, était considérable et justement comprise. M. Natalis de Wailly, au nom de l'Institut, M. Barthélemy Saint-Hilaire, au nom du Collége de France, et M. Guigniaut, au nom de l'Université de la famille et des amis de M. Burnouf, ont successivement parlé. Ils ont dit qu'à ses derniers instants, il avait pu connaître le suffrage unanime par lequel 'l'Académie, soigneuse de sa propre gloire,' lui avait décerné la dignité de secrétaire perpétuel et qu'il 'aurait abandonné, pour cette dignité qui comblait toute son ambition, les hautes fonctions dont il venait d'être investi par le Gouvernement, préférant ainsi aux interêts de sa propre famille, qu'il aimait pourtant d'un amour infini, la science, à laquelle depuis longtemps, et sans le savoir peut-être, il avait sacrifié chaque jour sa santé et sa vie;'—que le 'philologue de genie,' comme l'appelait la voix respectée de M. Villemain, vivrait 'de cette immortalité qui est promise aux grands travaux de l'intelligence qui leur suffit;' que 'la philologie française, honorée déjà par tant d'illustrations, n'aura rien produit de plus grand que lui;'—qu'il avait terminé son *Histoire du Buddhisme* quand son mal s'était déclaré il y avait trois mois, et que ses forces s'étaient 'usées dans la rédaction et l'impression du second volume de ce grand ouvrage' philologique, historique et philosophique, où il lui fut donné de 'réunir, dans une harmonie suprême, ces trois caractères de la veritable et complète érudition.'

"Il est impossible de rien ajouter a ces éloquens témoignages.

"E. A."

JOURNAL

OF THE

BOMBAY BRANCH

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ROYAL ASIATIC SOCIETY.

JANUARY 1853.

ART. I.—*On the Geographical Distribution of the principal Languages of India, and the feasibility of introducing English as a Lingua Franca.* By the Hon'ble Sir ERSKINE PERRY, President.

Presented July 1852.

INDIA, according to the most temperate authorities,* contains about one hundred and forty-one millions of inhabitants, who are distributed by Native geographers over fifty-seven, or, as some write, eighty-four provinces, all with peculiar languages.† Although this enumeration of different languages is, as we shall presently see, grossly exaggerated, there is no doubt that the diversity of tongues is very great; and the obstacle thereby interposed to free intercourse, and the diffusion of ideas from any central authority, is too obvious to be pointed out. My connection with the Board of Education at this Presidency having frequently led me to observe the complete isolation by which the intellectual movement of one province is separated from that of another, I have been induced to consider whether any means were at hand for encouraging the growth of a common medium of intercourse amongst

* Elphinstone's India, vol. i. p. 5.

† See Colebrooke, in As. Res. vol. xxiii. p. 220; but these are mythical numbers.

the educated minds of India. But the subject is too literary to allow of its being properly treated in a minute for a Government Board: it is, possibly, too political for discussion in a Society like this; yet, as the true object of the investigation of Oriental arts, sciences, and literature, for which this Society was established in 1804, is identical with that of politics, or πολιτεία, in its large sense, *i. e.* the art or science of increasing the happiness of man in civilized society; and as party feeling, fortunately, does not interpose in India, to cloud the judgment or awaken angry passions, I trust I may be allowed, without impropriety, to enter a field of inquiry, which, in some degree, touches upon the province of good government.

I.

I will first of all describe, as accurately as my means enable me, the limits of the principal languages of India; but, in our present state of knowledge, no such sketch can be anything more than an approximation to the truth, nor is it likely, for a long period to come, that an accurate language-map of India can be constructed. For, first of all, the limits of two neighbouring languages often occur in wild, unexplored, or unpeopled, tracts of country, so as to prevent the tracing of a precise boundary line; and, secondly, there have been such frequent vicissitudes among the governing Hindu races, each extending its language in turn over the territory of its neighbour, as to have created in many parts a complicated intermingling of languages, which would require for their unravelment a more minute inquiry, and closer study of the localities, than any European has yet been able to institute. Thus, in the country called, in Hindu nomenclature, *Karnátaka Désa*, or the high table-land above the Western and Eastern Ghâts of the peninsula, —which the English call, with no very precise definition, the Deccan,* the Southern Maratha Country, and Mysore,—Canarese and Marátha dynasties have alternately succeeded each other, and both have been broken in upon by invading powers from the Coromandel Coast in the south, so that the Canarese, Maráthi, and Tamil languages, have penetrated, each with a deep indent, into the language-region of its neighbours. Thus, on travelling through the Sátára districts last January, I found Canarese spoken in villages much to the north of the

* The ancient Hindu geographers gave the name of Dakshina, or the South, to the whole of India south of the Narbadda: the Mahomedans confined this name to the country south of the Krishna, while the English apply it in a different sense from either, and seem to confine it to the table-land between Kandésh and the Krishna.

limits assigned to it by the best authorities, reaching nearly up to Pandarpur; Maráthi, on the other hand, extends far to the south of Pandarpur, and Canarese and Marátha villages will be found to alternate throughout these districts, just as *Johannes von Müller* describes villages in Switzerland, where French is spoken on one side of a crooked street, and German on the other.

Notwithstanding, however, the numerous languages which have been assigned by Bráhmans to India, it was perceived by them from a very early period that a simple classification might be made; and a two-fold division was determined on, depending, mainly, on geographical considerations, by which five northern languages were grouped in one class, and five southern languages in another, under the denominations, so familiar to us in India, of *Panch Gaur* and *Panch Dravid*.

According to the enumeration of the Bráhman pundits, whom Colebrooke cites,* the following is the distribution usually given; and I need scarcely mention, that whilst the name of *Gaur*, or Bengal, is extended to the whole of Northern India, or Hindustan, the name of that part of the Coromandel Coast between the twelfth and thirteenth parallels of north latitude, called *Dravida*, is applied to the whole peninsula:—

The five "Gaurs."	*The five "Dravids."*
1, Saraswati (extinct).	1, Tamil.
2, Kanoji.	2, Maráthi.
3, Gaur, or Bengáli.	3, Carnatic.
4, Maithila, or Tirhuti.	4, Telinga, or Telugu.
5, Orissa, or Urya.	5, Gujaráti.

Mr. Elphinstone† gives a somewhat different division, assigning Gujaráti to the northern, and Urya to the southern languages; and the *Haiga* Bráhmans, in Canara, give a third list of the *Dravids*, excluding, strangely enough, the country on the Malabar Coast where they themselves are domiciled.‡

But it is unnecessary to examine these Bráhminical divisions further, as they are founded on no scientific principle, and convey little accurate information, although, by accident, the binary or mechanical division which geography, or, perhaps, a fanciful notion of symmetry, seems to have suggested, is the same which the increased knowledge of philology in the present day enables us to adopt. It would be unjust, however,

* See Colebrooke, As. Res. vol. xxiii. p. 219.

† India, vol. i. p. 278.

‡ F. Buchanan's Mysore, vol. iii. p. 90

not to add that the largeness of views, and the great amount of observation which rendered a generalization so nearly approaching to the truth possible, does infinite credit to Bráhminical intellect at the early period when these conclusions were drawn.

When European scholars first began to study the languages of India with diligence, they were inclined to suppose that the southern languages, as well as the northern, were derived from the Sanskrit. Dr. Cary, Wilkins, and Colebrooke, were all of this opinion. Mr. Campbell, in his Grammar of the Telugu or Telinga language, was the first to dispute this affiliation, and he pointed out the mode in which the Bráhmans had made large importations from the sacred language of their religion into all the southern tongues, so as to give the latter the appearance of a derivation from the Sanskrit. Ellis, who is the great authority on the southern languages, carried the investigation further; and he showed that the chief languages of the peninsula,—viz. (1) Kárnátaca, (2) Telugu, (3) Malayálam, (4) Tulu, (5) Tamil,—all belong to one family,* of which the latter is the most cultivated; and now, Campbell, Ellis, Rask, and Lassen, all seem to agree with the Revd. Mr. Taylor, that the Tamil and Sanskrit languages belong to essentially distinct stocks.† Mr. Taylor further thinks that there was originally one simple, homogeneous dialect, spoken by rude aborigines, from the Himalayas to Cape Comorin, of which the Tamil is the cultivated representative.

It scarcely, however, accords with the philological experience of other parts of the world, that at a period when the Native of India was a rude savage, one homogeneous tongue should prevail over the vast limits comprehended between the Himalayas and the Equator—for Ceylon, the Laccadives, and the Maldives equally fall within the Tamiloid zone. It would rather seem, that, if such a wide extension of one language or of closely allied languages can be demonstrated, its diffusion must be owing to the operations of some race already arrived at a considerable degree of culture. Undoubtedly the evidence of this wide diffusion of what I term, (in order to avoid theorizing,) a Tamiloid language, is very strong, and it is accumulating every day. Thus Mr. Reeve points out, in the Preface to his Canarese Dictionary, that "the affinity between the Teloogoo and Karnátaca is so great, that frequently it is only necessary to change an initial or an inflection to make the correspondence complete." But Ellis, as we have seen, shows both of

* See note in Campbell's Telugu Grammar, p. 3.

† See Preface to Rottler's Tamil Dictionary.

these languages to be cognate with Tamil. Again: the Tamil-speaking inhabitants of the Coromandel Coast can make themselves intelligible when they get into the districts on the opposite side of the peninsula, where Malayálam is vernacular.* So "the language of Tulava, (on the Coast of Canara,) has a strong resemblance to that of Malayálá,"† though, as I gather from the Tulu-speaking Natives of the Malabar Coast whom I have met in Bombay,‡ they are unable to understand their Malayálam neighbours. But it is not only in the fertile lowlands near the sea on either side of the peninsula, and on the easily-traversed plains of the plateau, that the Tamil family of languages is to be found. The valuable collection of manuscripts accumulated by Colonel Mackenzie, and the inscriptions gathered at great expense and pains by Mr. Walter Elliot,‖ afford us evidence of those wide provinces having been reigned over by Tamil and Canarese dynasties within historical periods, and hence the diffusion of these languages is explained. It is only when we penetrate the more remote and wild localities of India,—that singular language-group, or isle of languages (as Ritter terms it), the Nil Giris, where, it is said, five distinct languages are vernacular, the wilds of Gondwana, the hill tops of Central India and of Sindh,—and listen to the evidence as to the traces there discoverable of a Tamiloid tongue, that we become convinced of its wide and early diffusion. Captain Harkness, who was the first scholar to examine closely the language spoken by that remarkable race the *Todas* on the Nil Giris, pronounces it to be closely allied to the Tamil,§ and the subsequent investigations of the German Missionaries confirm this conclusion.¶ The inhabitants of the mountains of Coorg, who in independent bearing, good looks, and all the outward signs of well being, are by far the finest race I have seen in India, speak a language called *Kodagu*, which Mr.

* F. Buchanan's Mysore, vol. ii. p. 346.

† Ibid, vol. iii. p. 90.

‡ Hundreds of these men (they call themselves two thousand) are to be found in Bombay as palanquin bearers, and hamalls; but the bearer caste generally in Bombay, called Camatties, and the *Bui* above the Ghâts in the Deccan, who carry palanquins, are from Telinghana. The Camatties in Bombay have been settled here for a long period, but retain their Telugu language, and by the last census it appears that the part of the native town where they are located contains above eleven thousand souls.

‖ See article on Hindu Inscriptions. Jl. Rl. As. Soc. vol. iv. p. 8.

§ Description of a singular aboriginal race, &c. by Captain Harkness. London: 1832.

¶ See paper by Dr. Stevenson in this Journal, vol. i. p. 155; and a note by Dr. Scmid, ibid, vol. iii. p. 84.

Ellis informs us is a dialect of Tulu.* On the crest of that high and romantic range, extending from Cochin to Cape Comorin, and reaching to eight or nine thousand feet above the sea, Francis Buchanan found that the rude tribes spoke "a dialect differing only in accent from Tamil."† Again: Mr. Ellis points out that the language of the mountaineers of Rajmahal, dividing Bengal from Bahar, abounds in terms common to the Tamil and Telinga; and Mr. Hodgson, who has paid particular attention to this subject, after comparing the vocabularies of seven languages now spoken by rude tribes in Central India, pronounces all of them to belong to the Tamil;‡ and the Brahui, on the mountains of Sindh, are said to have a language very like that of the Todas. Indeed, the interesting inquiries which our colleague Dr. Stevenson is now conducting in this Journal respecting the grammatical structure of Indian languages, render it not impossible that a Tamiloid tongue will be hereafter found to have constituted the original staple of all the languages of India, although it has become obscured, and in some instances, like Celtic by the Anglo-Saxon, completely effaced by the preponderance of the intruding Arian element from the north.

However this may be, in the state of knowledge which we now possess, we are able to determine that a closely allied family of languages extends over the whole of Southern India, cropping out on the hill tops in Central India, and on the mountains of the West, and, perhaps, also traceable on the southern slopes of the Himalayas. According to Rask, who, with great lingual qualifications, examined the language of Ceylon on the spot, Cinghalese also, contrary to the received opinion, belongs to this family;‖ and Lassen states that the languages of the Laccadives and Maldives come within the same category.§

Advancing towards the north, we are met by the intruding languages of a different family, of which Maráthi, or its dialect Konkani, is the southernmost representative; and, according to the evidence which Lassen with great industry has collected, it would appear that a race

* Campbell's Telugu Grammar; but I learn from the Rev. Mr. Mögling of Mangalore that it is more closely allied to Tamil and Malayálam than to Tulu.

† Mysore, vol. ii. p. 338.

‡ Paper read before the Calcutta Asiatic Society, December 1848.

‖ Preface to Singalesisk Skriftlaere. Colombo: 1821. Cited by Lassen, *Indische Alterthumskunde*, i. p. 199.

§ The Missionary Weigle attributes the language of these islands to the Malayan family, but apparently without reason.—*Zeitschrift der Deutschen Morgenlandischen Gesellschaft*, 1848, p. 258.

from Central Asia, entering India at the north-west,* had diffused themselves and their language, their religion and their Bráhminical distinctions, over the plains of India, at a period before true history begins. We may even see traces on record of the mode by which, within a comparatively recent period, the priestly race from the north insinuated themselves into Southern India. In a manuscript in the Malayálam language, written on palm leaves, and forming part of Colonel Mackenzie's collection, an account is given of the introduction of Bráhmans from the north, which seems to contain some glimpses of true history. After describing the elevation of the land on the Malabar Coast by the power of Parasu Rama,—a tradition which, from its recurrence in one shape or another along the whole coast, and from geological evidence, may possibly shadow forth a true physical fact, the gradual elevation of the sea-bord,—it is said "he made the ocean withdraw, and Kerála was created." Rama then "brought Bráhmans from many points, and placed them in Kerálam, but they would not stay there. Therefore, having considered, he brought the Arya Bráhmans from the *Utara Bhumi*, [Land of the North,] and settled them there. The Arya Bráhmans continued to reside with constancy in Malayálam. This being heard by those that went away at first, they returned again, and these are called the Pattan Tulawar; but having originally come from different quarters, and of different tribes, the Pattan Tulawar *still use different languages*. Afterwards numbers of Tamuler came thither, and between the Tamuler Bráhmans who came, and the Bráhmanar who were already residing, there arose disputes about the burning of a dead body, &c. &c. But how they became Tamuler, and what the truth was, and how the *Bráhma Vat'ya* which had been incurred was cleared from them, Iswar only knows."†

As a general conclusion, therefore, we may say that the whole of India may be divided between two classes of language—the language of the intruding Arians, or Sanskritoid, in the north, and the language of a civilized race in the south of India, represented by its most cultivated branch, the Tamil. Just as the greater and most civilized part of Europe may be divided between two distinct families of language, the Teutonic and the Romanesque. According to this division, the principal languages of India will be ranged as follows :—

* *Indische Alterthumskunde*, I. p. 400, et seq. Dr. Weber, however, contends, that the Arians entered India from the north. See *Indische Studien*, p. 165. Leipsic : 1849.

† Mackenzie Collection, vol. ii. p. 83.

Arian, Sanskritoid, or Northern Family.

1, Hindi.
- *a* Hindustani, or Urdu.
- *b* Brij Básha.
- *c* Rangri Básha.*
- *d* Panjábi.
- *e* Multáni.
- *f* Játaki.
- *g* Sindhi.
- *h* Marwádi.

2, Kashmiri.†
3, Bengáli.
- *a* Tirhuti.

4, Gujaráti.
- *a* Kachi.‡

5, Maráthi.
6, Konkani.
7, Urya.

Turanian, Tamiloid, or Southern Family.

1, Telugu, or Telinga.
2, Karnátaka.
3, Tamil.
4, Malayálam.
5, Tulu.
6, Gondwani?

Limits of Hindi.

Speaking generally, the whole of Upper India, including the Panjáb, from the Himalayan to the Vindhyan range, but exclusive of Bengal, may be said to be possessed by one language, the Hindi. Nor is it only on the plains of Hindustan that it is to be found. On the southern slope of the Himalayas, in Kumaon and Gehrwal, Mr. Trail informs us the language is pure Hindi;‖ and generally along the sub-Himalayan range as far as the Gogra river, the impure Hindi dialect introduced by the Gorkhas from the plains appears to be extirpating the vernacular Thibetan tongues of the aboriginal mountaineers.§ Even beyond the limits I have mentioned, the genius of the language seems to prevail, as Mr. Masson found that with Hindi he could make himself intelligible throughout the whole of Kohistan.¶ It is not meant by the use of the word "Hindi" to denote a language of fixed characters, like French or Latin, or even like Bengáli and Maráthi: the term is only used to comprehend under a common designation the various dialects of a language essentially one, but which has received no great cultivation in any of its forms. According to the Bráhman pundits of Benares, "there are hundreds of dialects equally entitled to the name."** The Brij

* Malcolm's Central India, vol. ii.

† In the language-map accompanying this article, Kashmiri ought to have been denoted as a distinct language rather than as a branch of Hindi.

‡ Kachi, or the language of Cutch, might, probably, have been better classed under Hindi.

‖ Official Reports on Kumaon, published by the orders of the Lieutenant Governor. Agra: 1848.

§ Mr. Hodgson, As. Res. vol. xvi. p. 415.

¶ Masson's Journey, vol. i. p. 220; Ibid, vol. ii. p. 277.

** Report of Bombay Board of Education, 1848, p. 5.

Básha, (or Bhákha, as it is pronounced on the Ganges,) and the Panjábi, are the two most cultivated varieties of it,* but the Panjábi passes into Multáni, which a good philologist has shown in this journal to be a corrupted form of Panjábi; whilst Játaki, again, further to the south, is a corrupted form of Multáni,† and Sindhi and Hindi, in the opinion of an excellent Hindi scholar, are only provincial varieties.‡ But Sindhi, according to Lieut. Burton, who has studied it carefully on the spot, is "directly derived from Sanskrit, yet is a perfectly distinct dialect."‖ When the Maráthas extended their conquests into Hindustan, they found Hindi everywhere prevalent, from the limits of the desert to the frontiers of Bundelcund; and, finding it different from their own tongue, they called it, contemptuously, Rangri Básha, *quasi*, barbarous jargon.§ Sir John Malcolm extends the Rangri Bhákha as far west as the Indus, and east as far as the frontier of Bundelcund, where, according to Ritter,¶ the Bengáli tongue begins; but this is an error, for in Bundelcund, as in all the country to the Indus from the western frontier of Bengal, dialects of Hindi prevail.** The Marwádi and other dialects of Rájputána are said to be little connected with one another, but it is clear that they are varieties of Hindi, introduced by the intruding Rájput races; and, on travelling through Rájputána, it strikes the most cursory observer what a small element in the population the dominant Rájput constitutes.

Hindi, according to Mr. Colebrooke, and the Serampore translators of the Bible, owes nine-tenths of its vocables to Sanskrit roots: when it is spoken by Musalmans, and enriches itself from Persian or Arabic roots, it becomes Urdu or Hindustáni, in which form Garcin de Tassy observes it is employed by all Hindu reformers, or religious innovators; but this remark seems rather to apply to Hindi proper than to Hindustáni. When Hindi is spoken by Hindus, and draws on Sanskrit for enrichment or embellishment, it more appropriately deserves and bears the name Hindi; but the term is used so loosely all over India to denote the vernacular tongue of the district, that it is not easy to attribute to it a very precise signification.

Limits of Bengáli.

Bengáli, from its well-marked geographical limits towards the west, north, and east,

* Colebrooke, in As. Res. vol. vii. p. 230.
† Lieut. Burton. Bombay Journal, vol. iii. p. 84.
‡ James Prinsep. Beng. As. Jl. May 1837.
‖ Burton's Sindh, and the Races inhabiting it, p. 60. London: 1851.
§ Malcolm's Central India, vol. ii. p. 101.
¶ Asien, vol. vi. p. 768.
** See Hamilton's Hindostan, vol. i. p. 218.

according with the province of Bengal,—from its being the language of at least thirty million souls,—and from the cultivation which has been given to it, well deserves the name of a distinct language, though its relation to Sanskrit is, perhaps, not other than that of so-called Hindi. According to Colebrooke,* there are but few words in Bengáli not derived from Sanskrit; and the same writer observes of Tirhuti, on its north-eastern border, that it has great affinity with Bengáli. It may, perhaps, be observed at once, that, of all the languages belonging to the Arian class, our present state of knowledge does not enable us to determine whether they are developments of some tongue, of which Sanskrit is the cultivated representative, and of which *Magadhi* or *Pali*, at the æra of As'oka and the introduction of Buddhism to Ceylon, was a spoken form, or whether Sanskrit has been superinduced upon some aboriginal tongue, as it has been demonstrably, though in much smaller quantity, upon the Tamiloid languages of the south, and as French has been introduced into Anglo-Saxon. Certain it is, that in every Arian tongue, a considerable, and apparently primitive element is found, (in Gujaráti it is reckoned at one-third of the whole language,) which is not traceable to Sanskrit.

Gujaráti Limits.

On descending southwards, we find the Gujaráti in a sufficiently compact and characteristic form to constitute it a language, and owing its unity of character, no doubt, like the Bengáli, Urya, Maráthi, Canarese, and Tamil, to an early and powerful dynasty, extending over the country where it is spoken, and of which we have ample traces in history. The dialects of Kachi and Sindhi are quite intelligible to our Gujaráti interpreters in the Supreme Court, but Kachi seems to be a transition dialect between Sindhi and Gujaráti,† and the intelligibility of these languages is probably owing to the common relation of all of them to Hindi; though, occasionally, inhabitants of those countries use a *patois* that is quite incomprehensible to a Native of Gujarát. This, however, is no more than occurs amongst inhabitants of different provinces of Europe, such as Italy or France, where the language is but one. Gujaráti is bounded by the Marwádi a little to the north of Deesa, to the north and east by the Hindi or Rangri Básha of Malcolm‡ in Rájputána and Malwa respectively, and in the south it dove-tails with Maráthi in the valleys of the Narbadda and Tapti, ending at *Hámp*, on the former river, and running into *Nandobár* on the latter.

* As. Res. vol. xxiii. p. 224.

† See Lieut. Burton's Sindh, p. 69.

‡ Malcolm's Central India, vol. ii. p. 191.

Limits of Maráthi.

The Maráthi, as I have before observed, extends further to the south than any other member of the northern family of languages; and it has one remarkable peculiarity,—it is the only language on the west coast to which the natural barrier of the Western Ghâts has opposed no obstacle to its diffusion on both sides of the range, the cause of which I apprehend to be that the Maráthas were originally a race of mountaineers, situated on the crest of the Ghâts, it is said in *Baglán*, and cultivating the fertile valleys, or *Máwals*, running to the east, as well as the eligible depths in the Konkan on their western border. Being, moreover, a martial race, the favourable isolated hills which present themselves for defence in the latter rugged region would further tempt them to descend the precipitous sides of the *Saihádri* range, and to occupy the Konkan. The country called *Mahárâshtra*, which is first mentioned in Indian history in the *Mahâwánso*, probably obtained its name, and received a distinctive language from the existence of a Marátha dynasty, at some period not recorded in history. But at a comparatively recent date, I think, it clearly appears from the inscriptions translated by Walter Elliot, that the *Yádavas*, who held *Devagiri* or *Daulatabád* A. D. 1294, when the Mussalmans first turned their arms against the south, were Maráthas, and not Rájputs.*

The northern limits of Maráthi on the sea coast are to be found in the Kolwan Hills, or country of the Koles, near the Portuguese settlement of *Daman*, and it extends above the Ghâts in a north-easterly direction along the *Sátpura* range, parallel to the Narbadda.† About *Nandobár*, in the jungly valley of the Tapti, it intermingles with Gujaráti. To the eastward, its boundary has not been ascertained, but it is spoken throughout *Berár*, and in the open part of the territories of *Nágpur*; and on the whole of its eastern border it abuts on the country and language of the Gonds. From the *Nágpur* territories, Maráthi trends to the south-west, "touching in advance nearly on *Bijapur* and *Shankashwar*,"‡ and thence trends south-westerly to the coast at *Sidashaghur*, along the line marked out by Colonel Wilks and Mr. Walter Elliot as the western boundary of Canarese. From *Daman*, in the Northern Konkan, Maráthi runs down the coast both below and above the Ghâts to the neighbourhood of Goa, where it meets the language which Lassen,

* See W. Elliot, in Jl. Royal As. Soc. vol. iv. p. 28—30; and Briggs' Ferishta, vol. iii.

† Dr. Wilson, in *Oriental Christian Spectator*, 1848.

‡ Dr. Wilson, *ut sup.*

following his authorities Mackenzie and Ellis, calls Konkani,* and which language runs, according to Mr. Walter Elliot, nearly as far as Mangalore,† but the southern limits of this mixed dialect, however, I learn from Native travellers, and from the German Missionaries at Mangalore, is a village four miles north of *Upi*, or Oodapee, near Coondapore, where Tulu, or the language of Canara, begins.

Limits of Konkani.

This Konkani dialect, however, appears to be no other than Maráthi, with a large infusion of Tulu and Canarese words, the former derived from the indigenous inhabitants of Tulava, or Canara, the latter from the long subjection of this part of the Konkan to Canarese dynasties above the Ghâts. F. Buchanan found that at Carwar, fifty-five miles to the south of Goa, "the dialect of Konkan is used, but, from having been long subject to Beejapore, almost all the inhabitants can speak Maráthi."‡ The fact is undoubted; but the reason given is wrong, as the vernacular language of *Bijapur* is Canarese, and not Maráthi. Konkani being the mother tongue of many numerous classes in Bombay,—amongst others of the Shenvi Bráhmans,—I requested Mr. Murphy, Chief Interpreter of the Supreme Court, to examine the language for me, and I subjoin a very interesting note of his upon it.‖

The subject, however, requires a closer philological investigation than it has yet received, and I am informed by the Revd. H. Mögling, of Mangalore, that the Konkani-speaking Bráhmans of that part of the coast, where the language is vernacular, consider it quite distinct from, though cognate with, Maráthi, and that it has an equally elaborate grammar of its own. The limits extend from Goa below the Ghâts, to the village before mentioned, north of *Upi*.

* *Indische Alterthumskunde*, vol. i. p. 360.

† Jl. of As. Soc. of Bengal, Nov. 1847.

‡ Cited in Hamilton, vol. ii. p. 262.

‖ "An examination of the grammar of the Konkani proves it to be decidedly that of the Maráthi language. The nouns and verbs are inflected in the same manner, with some slight modifications in the details. A general characteristic which it shares with Gujaráti and Marwári, is the adoption of *o* as the masculine termination, instead of the *á*, used in Hindí and Maráthi.....The Konkani explains some of the difficulties of the Maráthi: what are anomalies or defective in the latter are sometimes found normal and complete in the former. It bears the stamp of a peculiar Bráhminical influence, many Sanskrit words being in common popular use for natural objects which are not so, as far as I know, in any other part of India. These are pronounced purely by the Shenvis, but by the common Christian population, (Natives of Goa,) are corrupted. Thus the common terms for *water*, *tree*, and *grass*, are Sanskrit: pronounced by the Shenvis *udak*, *vriksh*, *trin*; by Native Christians *udik*, *vukh*, *tan*.—*Note by Mr. Murphy.*

From this part of the coast in northern Canara, a diagonal line, running in a north-east direction towards Beder, marks the boundary between Maráthi and Canarese,*—of the latter, at least, above the Ghâts. In the neighbourhood of Beder the three languages of the Bala Ghát or plateau—Telinga, Maráthi, and Canarese—are said to meet.†

Limits of the Urya.

The language of Orissa is the last member of the Arian or Hindi family which requires to be mentioned. The original site of the Or, or Odra tribe appears to have had very narrow limits, viz. along the coast-line from the *Rasikulia* river, near *Gánjám*, northwards to the *Bans Kans* river, near *Soro*, in latitude 21° 10′; but in the process of migration and conquest under the *Kesári*, and more especially under the *Ganga Vansa* line, the limits of Orissa (*Or-dêsa*) were extended to Midnapore and Hooghly on the north, and to Rajahmundry on the Godavery to the south.

Orissa is backed to the westward by a range of granite hills, from 300 to 2000 feet high, but attaining higher elevations in the wild and little explored regions of Gondwana, further west. At the foot of these hills, the Konkan, or plain between them and the sea, is divided into two distinct portions. On the first, beds of laterite of considerable depth run out in easy undulations to the plains, on which not a stone of the size of a pebble is to be found between the termination of the laterite and the ocean. This district is, again, bounded by a marshy woodland tract along the sea shore, varying in breadth from five to twenty miles, and resembling the Sunderbuns of the Ganges in its innumerable winding streams, swamps, tigers, and alligators. It is on the other comparatively fertile lands of the central district called the *Mogalbandi* that the civilization and aggrandizement of the Urya race has developed itself.

The language, according to Mr. Stirling, "is a tolerably pure Bâsha (dialect) of Bengáli."‡ In the direction of Bengal it follows the coast-line as far as the Hijellee and Tumlook divisions on the Hooghly. On the western side of the Midnapore district it intermingles with Bengali, near the river *Subanrekha*. To the westward, the Gond and Urya languages pass into each other; the Rajah of Sonnapur informing Mr. Stirling that half his people spoke the one language, half the other.‖

* Colonel Mackenzie, in As. Res. vol. vii.; W. Elliot, in Jl. of Royal As. Soc. vol. iv. p. 30.

† Colonel Wilks' Historical Researches in Mysore.

‡ Account of Orissa. As. Res. vol. xv.

‖ Ibid.

About *Gánjám*, on the coast, the first traces of Telinga occur. The Urya still prevails, however, forty-five miles south of *Gánjám* on the low lands of the sea shore, beyond which Telinga begins to predominate: at Cicacole the latter is the prevailing dialect, and in Vizagapatam Telinga only is spoken in the open country, though Urya on the mountains runs further down to the south.*

Limits of the Gond language.

Of the Gond language, Professor Lassen, writing in 1843, says that we know absolutely nothing.† Captain Blunt, whose interesting journey in 1795, from Benares to Rajahmundry, gives us almost all the information we possess of many parts of the interior, observes of the language that it differs wholly from all its neighbours, Telinga, Maráthi, Urya;‡ but as Ritter observes, this is the remark of a mere traveller, not a philologist. The *jet blackness* attributed to many of the tribes,‖ and pointed out both by Stirling and Blunt, is another example out of many to be found of the dark colour of the aborigines of India. Since Lassen wrote, however, the collation of the vocabulary of the Gonds with the languages of the south would seem to leave little doubt that we may safely classify Gondi as a member of the Tamiloid family.§

At present, however, the Gondwana highlands and jungles comprise such a large district of unexplored country, that they form quite an oasis in our maps; and as the Bengáli, Maráthi, Urya, and Telinga languages all abut upon them, it is impossible to trace their respective boundary lines with accuracy.

In dismissing the languages of the North, we may observe that their distribution and acquisition of distinctive characters appear to be owing to two causes—first, the geological features of the country over which they are spread; second, the accident of independent and powerful dynasties erecting themselves in certain localities. Thus, if the Arian race entered India at the north-west or north, and settled themselves, as all tradition indicates, in the Panjáb, and towards the valley of the Ganges, the wide plains of Hindustan, over which a buggy may be driven in the dry season for a thousand miles in every direction without a made road, would present no obstacle whatever to civilized races such

* Stirling. As. Res. vol. xv. p. 206.

† *Indische Alterthumskunde*, vol. i. p. 375.

‡ Narrative of a Tour from Chunarghur to Yertnagoodum, &c. As. Res. vol. vii. p. 57.

‖ Stirling, *ut sup.* p. 204. See as to Negroes of India, ante p. 246 (note).

§ See paper by Mr. Walter Elliot, in Jl. of As. Soc. of Bengal, Nov. 1847. Ditto by Mr. Hodgson, on Seven Languages of Tribes in Central India. Ibid, Dec. 1848.

as Alexander encountered, and Megasthenes describes, who were tending to diffuse their civilization and their language. The Arian conqueror or adventurer, whichever he might be, in descending to the south, would find physical peculiarities in the country pitched upon that would either wed him to the spot, or would offer obstacles to a speedy return. Thus, those who surmounted the barren heights separating Bahar from Bengal would feel too well pleased with the alluvial richness of the well watered plains below them to seek to retrace their steps, and a favourable combination of circumstances would soon raise *Gaur* into a kingdom, and Bengáli into a national tongue. The same train of circumstances operating on those who reached the fat lands of Gujarát, after quitting dreary Marwar, and shaking off the dust of its western desert, would soon induce them to convert their tents into houses; and the early existence of a Gujaráti kingdom fully accounts for the growth and distribution of its language. On the other hand, those who ascended the plateau of Bundelcund, or penetrated the fastnesses of Rájputána, might have been sufficiently pleased with the easy dominion they obtained over the wild indigenous *Bhils* and *Meinas*, to induce them to abandon the more fertile plains below; but as such localities gave no opportunity for extended empire, the Hindi they brought with them never grew up into a distinct language, and is only distinguishable as a *patois* from the Hindi of the plains. Whether the *Bhils* of *Rájputána* and of the *Satpura* range, the *Kolis** of the Western Ghâts, and other hill tribes in this Presidency, have retained any traces of an aboriginal language, I have never been able to ascertain; but the fact is stated broadly by Sir John Malcolm, and it is not unlikely to be correct.

The Maráthas, like the *Gujars*, were probably able, as I have suggested, to establish an extensive empire at an early period, although we have no such authentic accounts of it as we have of the dynasty established at *Anhalwára Patan*, in Gujarát; but it is not improbable that the city *Tágara*, mentioned in the Periplus, was a Marátha capital. Now, as these two dynasties came into contact in the Gulf of Cambay, it is instructive to observe the point at which the Gujaráti and Maráthi languages divide. On looking at the map, it is difficult to understand why Gujarát should turn the corner of the Gulf of Cambay, or, at all events, why it should descend the coast, and cross the rivers Narbadda

* The Ramusis of the Bombay Ghâts have immigrated from Telingana within a recent period, and though they have adopted Maráthi, they preserve a few terms of their original Telinga for purposes of crime, &c. See Captain Macintosh's Account of the Ramoosies. Bombay: 1833.

and Tapti. But, on visiting the country, the physical features of the land, and the characters of the two races, explain the phenomenon at once. The *Gujars* are excellent cultivators,* and the country they inhabit is a fine plain of alluvial loam, in many parts forty feet deep, and though composed of granites from the Aravalli range, quartz from the Méwar hills, and sandstone and trap from the Malwa plateau, so worn down is the whole alluvium by the gradual descent from the highlands, that, as in the Orissan *Mogalhandi*, not a pebble is left in the country to scare a crow withal. The Maráthas, on the other hand, are essentially mountaineers, herdsmen, and soldiers, but bad farmers. As, then, the black soil of Gujarát descends the coast as far as *Daman* to the foot of the *Kolwan* Hills, where Kole Rajahs still hold their rustic court, the *Gujars* naturally followed the course of the soil they knew so well how to till, whilst the Maráthas clung to their more congenial hills.

If we now approach the Tamiloid languages of the south, we shall find that similar geological causes and dynastic influences have governed their distribution.

Limits of the Telinga language.

On taking up the point at the east coast, where we left the Urya-speaking races extending themselves to the southwards, the Telinga language begins somewhere about *Gánjám*, though Urya seems extending itself southwards. At Vizagapatam, which is 120 miles further south, Mr. Stirling states that Telinga is exclusively spoken. Formerly, the limits of the language along the coast appear to have extended further to the north, and in the south they reach to the neighbourhood of the Pulicat lake, near Madras. On this coast, two Telinga monarchies formerly existed, the *Andhra* and the *Kalinga*,† both, apparently, enterprising races, and, as I pointed out in our last number, sea-faring people, although pious Hindus. The Hindu conqueror of Ceylon, (*Vijaya Wála*, the Conqueror,) who about 500 years B. C. invaded the island, probably proceeded from this part of the coast,‡ as the *Mahawanso* makes mention of an *Andhra* princess, who, after living in the jungles of Lada (?) intermarried with a lion, (Singh,) and was ultimately

* The race are no longer known by name in Gujarát, but they are well known as the best cultivators in the N. W. Provinces. See *ad vocem* that most instructive work for Indian customs—Sir Henry Elliot's *Glossary of Indian Terms*; and the field of Gujarát on which the last battle with the Seikhs was fought points out the wide diffusion of the race.

† Walter Elliot, in Jl. of Royal As. Soc. vol. iv.

‡ Lassen, however, thinks that *Vijaya* and his 700 followers proceeded from Gujarát. *Indische Alterthumskunde*, vol. i. p. 199.

the grandmother of *Vijaya*. The *Kalinga* dynasty appears subsequently to have gained great possessions on the plateau above the Ghâts, and, at the period of the Mahomedan conquest, Warangol, seventy miles NE. of Hydrabad, was considered the capital of what the Musalmans call Telingana. A great portion of the Nizam's Dominions, the districts of Cuddapah and Bellary, and the coast-line I have before described, are occupied by Telugu-speaking people.* Towards the lower part of the course of the Godavery, Capt. Blunt found that river to be the boundary-line between the Gond and Telinga languages.†

Limits of the Tamil language.

The Tamil language, according to Hamilton,‡ is "principally spoken in the tract from the south of Telingana to Cape Comorin, and from the Coast of Coromandel to the great range of hills, including great part of the Baramahal, Salem, and the country to Coimbatore." This, however, is a very indefinite description, as it does not appear whether he means the eastern or western hills; and from Colonel Mackenzie, and Mr. Elliot, who are the two best authorities on Canarese, the latter language appears to be well rooted in Coimbatore. Tamil was the language of three Hindu dynasties of whom we have records. The Cholas of Tanjore and Combuconam, who were settled on or near the Cáveri and Coleroon rivers, and who gave their name to the Coromandel, or Cholamandel Coast,‖ the Pandyans, whose capital is now occupied by the inhabitants of Madura, and the Cherans, who ruled at *Kerála* on the Malabar Coast. According to Mr. Taylor, Tamil was cultivated in its greatest purity in the ancient Pandyan kingdom, and, in the opinion of that very competent judge, "the result of a process, not very dissimilar to that which the early Saxon has undergone, [viz. copious infusions from a foreign tongue,] is to render the Tamil language, like our native English, one of the most copious, refined, and polished languages spoken by man."§ The examination of a good map will explain the easy diffusion of Tamil over the rich delta of the Cáveri, and over the low lands at the foot of the peninsula as far as the spring of the stupendous Western Ghâts that end at Cape Comorin, and even up to their very summit on the *Ani-Malaya* range, as we have seen ante p. 291; and the gradual ascent of the Eastern Ghats from the

* Hamilton, vol. ii. p. 121.

† As. Res. vol. xii. p. 57.

‡ Hamilton's Hindustan, vol. ii. p. 248.

‖ Paolini the Carmelite explains Chola-mandala to mean the middle country, but most scholars interpret it the country of the Cholas.

§ Preface to Rottler's Tamil Dictionary

Coromandel Coast explains readily how the Tamil-speaking *down-easters* and conquerors from that coast surmounted the plateau, where, like their northern neighbours of *Kalinga*, they have permanently implanted both their race and language. The Tamúlians are a pushing, enterprizing race, and, as will be seen presently, the Tamil language appears to be extirpating Malayálam. The two languages dove-tail without coalescing in the low lands at the great gap of the Western Ghâts, and Tamil is also found to the westward of Cape Comorin on the coast, for example at Travancore, the ancient capital of the Rajahs.

Limits of Canarese.

The limits of the Canarese are the most distinct in geological relations of any we have yet spoken of. It is essentially a plateau language. The ancient Hindu term *Karnátaka* comprehended all the high table-land in the south of India above the Eastern and Western Ghâts, but, by a strange fatality, as Hamilton observes,* this country has not only lost its proper designation, but the latter has been transferred to the Carnatic, on one coast, and to Canara on the other, in neither of which is the Canarese language strictly vernacular. So, also, the Carnatic dynasties, so far as we know from history, or rather from inscriptions, never held sway below the Ghâts. Hamilton's general description of its limits seems correct enough:—"The common Canara Kárnátacá character and language are used by the natives of those countries from Coimbatore, north to Balky, near Beeder, and within the parallels of the Eastern Ghâts to the Western."† Mr. W. Elliot, who was for some years stationed at Dharwar, draws its boundary-line W. and N. by a "line from Sádashagur on the Malabar Coast to the westward of Dharwar, Belgaum, and Hukairi, through Kagal and Kurandwar, passing between Kelingaon and Pandegaon, through Brahmapuri on the Bhima, and Sholapur, and thence east to the neighbourhood of Bider. From Sádashagur, following the southern boundary of *Sunda* to the top of the Western Ghâts, it comprehends the whole of Mysore as (far as) Coimbatúr, and the line of Eastern Ghâts—including much of the *Chola* and *Belála* kingdoms, and even *Dwara Samudra*, the capital of the latter, which was never captured by the *Chalukyas*" (*i. e.* the Carnatic dynasty of Kalyani).‡ I have before shown, however, that Canarese extends much further to the north than Mr. Elliot's boundary indicates: it was the language of business of the *Adil-shahy*

* Hindustan, vol. ii. p. 247.

† Ibid.

‡ Journal Royal As. Soc. vol. iv. pp. 3, 4.

dynasty at Bijapur, who introduced it, to the exclusion of the court language, Persian ;* and throughout the whole of the Belgaum and Dharwar collectorates it is the vernacular language, although, strangely enough, on the establishment of schools by the Bombay Government in that district in 1840, the Canarese population stoutly resisted instruction being conveyed to their children in their mother tongue, and pleaded for Maráthi.† In the south, also, towards Coimbatore, I apprehend that Tamil dove-tails intricately with Canarese, as Maráthi does in the north, and Telinga in the north-east. I find in a report of the Collector of Coimbatore to the Madras Government, that there are 846 schools in that collectorate, "in which the children are taught Tamil, Teloogoo, Hindivee, (Canarese,) and other (?) native languages."‡

Limits of Malayálam.

Of the Malayálam and Tulu languages I have little to say, except that they each of them appear to be in a course of gradual extinction. They are essentially *Konkany* languages, if I may be permitted the use of such a word (much wanted in geography) to describe a country lying at the foot of a chain of mountains running parallel to the sea, and intercepted between the two, and of which the Bombay Konkan is a good type. Malayálam extends from Cape Comorin to the Chandagiri river, or, more strictly, perhaps, to Nileshwar, (*Nileswara,*) where a Nair Rajah conquered by Hyder formerly ruled.‖ We have seen that a rude Tamil dialect is spoken on the tops of the Western Ghâts from the great gap to Cape Comorin ; and the language seems gaining upon and extirpating Malayálam both to the north and south. For Tamil, advancing from the west through that singular break in the mountains, having no physical obstacles to encounter, is found pushing its way onward to the west of Palghat, and Palghat itself is more a Tamil than a Malayálam town. The Malayáli is said naturally to shrink from

* Briggs' Ferishta, vol. iii.

† This feeling might be accounted for amongst those who were training their sons for Government offices, as Maráthi, under the Peshwa, was the language of public business; but it was altered by the British Government in 1836 to Canarese: the feeling, however, was equally strong amongst the *Lingayat* traders, who are very numerous in those parts. Thus, the Superintendent of Schools, Assistant Professor *Bál Shástri*, reported in 1845 of a school near Belgaum:—"Several of the Lingayat children, who understand not a word of Marathi, would yet insist upon learning nothing but reading and writing that language." Much evidence on the subject is to be found in the Reports of the Board of Education.

‡ Madras Almanac for 1834, Appendix, p. 24.

‖ F. Buchanan's Mysore, vol. iii. p. 12.

contact with foreigners,—even from people of his own caste,—whilst the Tamulian is the least scrupulous of all Hindus. Hence the Malayáli retreats from the great roads, from cities and bazars, as eagerly as the Tamil flocks to them; and the former race are to be found isolated with their families in their high walled *parambus* even in parts where the lines and centres of communication are entirely occupied by their more enterprizing eastern neighbours.*

Limits of Tulu.

Tulu is the language spoken in the very limited district extending from the northern limits of Malayálam at the *Nileswara* river, lat. 12° 10′ N., to the *Bhahávara* river, four miles north of *Upi*, 13° 30′. It is broken in upon by many languages, both north and south, and appears to be in a state of progressive decay. To the humbler classes at Mangalore, and within the limits described, the German Missionaries find it is the only language in which they can make themselves intelligible, though they preach in Canarese to the upper classes; and it ascends, as we have seen, in an archaic form, to the top of the mountains in Coorg, 6000 feet high. It is stated, also, that in many parts of Canara Canarese is vernacular;† and the Revd. H. Mögling, who, with his brethren of the Basle Mission, has paid much attention to this language, informs me that it may be considered vernacular from Cunderpore (*Kundapura*) to Honore (*Honavera*,) where Konkani begins. But I am inclined to doubt whether Canarese is strictly vernacular anywhere along the coast, except amongst immigrants. It is the mother tongue, for example, of the *Haiga* Bráhmans, whose principal station is at *Kalyánapura*, a village four miles north of *Upi*, although by race they belong to the northern, or *Gaur* Bráhmans; and so long back as 1803 F. Buchanan found that all Natives of rank spoke it, from the country having been subjected for centuries to princes above the Ghâts.‡ Canarese is now, also, the language of the British Government in this province, and, therefore, a still greater impetus is given to its diffusion, so that it may be anticipated it will become vernacular at no very distant day.

In taking a parting glance at the Malabar Coast,—the Pirate Coast —the Pepper Coast,—as it has been alternately called,—the country of the Zamorin,—of the exploits of Vasco de Gama, and of the even more heroic efforts of St. Francis Xavier,—a country where the richest gifts of nature spontaneously present themselves, and primeval forests,

* MSS. information from German Missionaries.

† Paolini Viaggio alle Indie Orientali, p. 262.

‡ Mysore, vol. iii. p. 103.

tenanted by wild elephants, and almost equally wild races of men, still cumber the earth,—a land of singular physical formation, and peopled by not less singular races,—Nairs, Bunts, Moplahs, Kolis, White Jews, Nestorian Christians,—all affording so many points of European interest, —we may note, as pertinent to the present inquiry, that from the Gulf of Cambay to Cape Comorin, in the narrow strip between the mountains and the sea, the following languages are vernacular:—Gujaráti, Maráthi, Hindustáni, (amongst the Konkani Musalmans,) Konkani, Canarese, Tulu, Malayálam, and Tamil. So much influence on language has the physical face of a country.

II.

After having thus taken what I trust will appear a sufficiently accurate view of the lingual state of British India, the question naturally arises, whether anything can be done, by the exertion of human forethought and prevision, to facilitate a closer intercourse, and greater diffusion of ideas, amongst our Indian fellow-subjects, who are now immured in so many isolated and distinct language-groups. To solve this problem, it is necessary to consult, carefully, the page of history; and, fortunately, the vicissitudes of race and of empire which have occurred in Europe during the last two thousand years, and the accurate records we possess of the events of this period, enable us to apply our experience to the field of Asia with advantage.

On a cursory view, nothing would appear more immutable than language; and some of the phenomena connected with the subject which first strike the eye would seem to warrant the same conclusion. The mother tongue, learnt, not taught, in early infancy, though subject, like a plant, to the laws of growth and spontaneous development, would seem, in its staple, to be proof against any invasion from without, either by a foreign stranger, or even by a neighbour. We may see in this Presidency, for example, Canarese and Maráthi villages lying grouped together on the same plain, and co-existing for a thousand, perhaps thousands of years, yet without any considerable intermixture of their languages. Each village, strong in its own organization, with its three estates of hereditary officers, established clergy, and faithful commons, wants nothing from its neighbour; and the only point of communication on which they ever need to meet, is on some grazing-ground adjoining their common border, which, so far from bringing them into amicable intercourse, may give birth to differences, lasting, like a German lawsuit, for hundreds of years. So, also, in the Swiss villages, spoken of by the historian of Switzerland, where the French and German races meet,

if the stock of each is sufficiently large to enable the social business of life to go on—the marrying and giving in marriage,—the eating and drinking,—the lessons of the school and the ministrations at the altar—without dependence on the other, then the barriers interposed by different tongues—the small differences, which in small minds and small places create mutual repugnance—keep the languages and the races distinct for countless generations. But if any cause, either political or commercial, occur to throw adjoining nations or races into a state of fusion, it is remarkable to observe how speedily an instrument of intercourse springs up, and what great and rapid changes of language ensue. Frequently, by a mere spontaneous movement or tacit convention, nations with different tongues, who have common interests to discuss, seize on some one language, which becomes the medium of intercourse, and is subsequently employed by many different races. Thus, the language spoken by the Genoese and Venetian traders, when they were seeking the commerce of the East in the ports of the Levant and the Black Sea, was soon learnt by the Asiatic inhabitants of those countries; and other European merchants, speedily adopting the tongue of their commercial rivals, a language of the Franks, or *lingua Franca*, arose, which Asiatics and Europeans both made themselves masters of, and which continues to this day. Hindustáni, as spoken in Bombay amongst Persian, Maráthi, Gujaráti, and other inhabitants of the island, with distinct mother tongues, is another example. The use of Malay among the many hundred languages of the Indian Archipelago, where, we are told by a quaint old voyager, it is "epidemick,"* is a still more striking instance of the same kind.

But it has been by the direct action of Government that the more remarkable changes in the languages of different nations have been effected. The historian Niebuhr, in commenting on the rapid process by which the Etruscans succeeded in imposing their language on the inhabitants of ancient Italy, which was then cut up into more distinct tongues than those now spoken in the peninsula of India, supplies a number of parallel cases from his historical stores, and the passage is worth transcribing:—

"Under the rule of a conquering nation which imposes a heavy yoke on the conquered, the language of the latter frequently becomes extinct: in Asia and many other countries, it was the practice to forbid the use of the vernacular tongue, in order to prevent treachery. The Moors were, in many respects, mild rulers in Spain, and the country flourished

* Herbert's Travels, p. 366.

under them; but in Andalusia, one of their kings forbade the Christians to use the Latin language, under penalty of death, the consequence of which was, that a hundred years later not a trace of it occurs. The whole Christian population of Cæsarea spoke Greek down to the eighteenth century, when a Pasha prohibited it, and, after the lapse of thirty or forty years, when my father visited the place, not one of the inhabitants understood Greek. When the Normans conquered Sicily, the only languages spoken in the island were Greek and Arabic, and the laws were written in Greek as late as the time of Frederick II., but afterwards it disappears all at once. The same thing happens in Terra di Leca and Terra di Otranto, where afterwards the names were Italian, while the language of common life remained Greek, until 200 years ago, in the fifteenth century, it died away. In Pomerania and Mecklenburg, the Wendic language disappeared within a few generations, and that without an immigration of Germans, but merely because the princes were partial to the German language: the conquerors of Brandenburg forbade the use of Wendic under penalty of death, and in a short time nothing was spoken but low German. The Etruscans had quite an aristocratic constitution, and lived in the midst of a large subject country: under such circumstances, it must have been of great importance to them to make their subjects adopt the Etruscan language."*

But the subsequent success of the Romans in supplanting Etruscan, and fixing the Latin language deep in the soil, not only of Italy, but of Spain and France, is a more remarkable case than any recorded by Neibuhr, and deserves, perhaps, a closer attention by scholars than has yet been given to it. Take for example the case of France:—At the time of Cæsar's conquest, the language was Gaelic, spoken in three different dialects,† and the country that was able to hold that great general at bay for nine years must have been tolerably thickly peopled. How, then, was the Celtic tongue so thoroughly extirpated? There is no appearance that the Romans colonised France in any great numbers, or that there was any temptation offered to them to settle. The question becomes more difficult to answer when we recollect the subsequent immigration and conquests of the Franks and other German races. Meyer assures us, (though it appears to me doubtful as to any but the dominant race,) that up to the end of the eighth century "il est certain que pendant tout ce temps et un bien plus long encore, le commun de la nation ne parlait qu'une langue d'origine tudesque."‡ Dr. Young,

* Lectures on the History of Rome, translated by Schmitz. London: 1848.

† Sir James Stephen's Lectures on the History of France. London: 1852.

‡ Institutions Judiciaires de l'Europe, vol. i. p. 203. Notwithstanding the high

also, states that the inhabitants spoke Gaelic till the sixth or seventh century, when it was superseded by Rustic Roman.* Here, then, if Meyer is correct, we have the bulk of the nations changing their language from Celtic to Teutonic, and from the latter to that modification of the Roman which subsequently became French; but certainly the change from Gaelic to French was universal.

Some authorities, quoted by Michelet,† would seem to show that it was an established principle of policy with those great masters of political government, the Romans, to introduce their language whenever they could as an instrument of police. St. Augustine states that the "Imperial City" took pains to impose her language as well as her authority on her conquered dependencies, for the sake of good order (*per pacem societatis*).‡ The Roman Digest laid down expressly that the judges of the empire were to deliver their decrees in Latin,‖ and *Valerius Maximus* points out both the fine statesmanlike policy which dictated these ordinances, and the steady Roman consistency (*magna perseverantia*) with which they were adhered to. It does not seem, therefore, very hazardous to attribute the existence of the French, Spanish, and Italian languages, in their respective countries, to the direct institutions of Roman policy, operating at a long period after the original impulse given by government.

Another example of the influence of the governing authorities upon the language of the people may be taken from England. I will pass over the supplanting of Celtic by the tongue of the Anglo-Saxons,

authority due to M. Meyer, this statement is very doubtful. According to Sismondi, (Histoire des Français, i. 52,) the three Celtic dialects spoken in the time of Cæsar had given way to Latin by the fourth century after Christ; and, although the conquests of the Franks carried a Teutonic language all over France, and it became the language of the army and of business, so that all men in office whose mother tongue was Latin were compelled to learn it, (Sismondi, iii. 58,) still the small number of Frankish nobles amongst whom the territories of France were divided, and who in numbers have been compared to English squires of the present day, forbids us to believe that the "bulk of the people" ever spoke a Teutonic dialect. Indeed, we know that Charlemagne, whose mother tongue was German, used to avoid Paris as a residence expressly because the language was the to him unintelligible *patois* of Latin, subsequently to become French. And it is remarkable how very slight an impression the German language has made upon the French, although the Franks in France were more numerous than the Normans in England.

* Encyclopædia Britannica, Art. Language.

† Histoire de France, vol. i. p. 135.

‡ De Civ. Dei, lib. xix. c. 7.

‖ Dig. xlii. i. 48: *Decreta a prætoribus latine interponi debent.*

although that, also, is a very remarkable fact, and not at all to be explained by the usual hypothesis put forward. But on looking at the language of England from the date of the Norman Conquest, it would appear that during the first three centuries there were many periods when it seemed quite uncertain whether Anglo-Saxon or Norman French would become the language of the country. So late as the end of the fourteenth century, the latter was the language of the court, of the nobility—of every one who possessed or sought either power or place. An old monkish writer cited by Thierry* avers that even peasants, in order to appear more *respectable*, (that conventional respectability so dearly cherished by the English race,) affected to talk French with all their might and main (*omni nisu*); and many circumstances seemed favourable for the introduction of the French language during this epoch. The facility of that language to diffuse itself is seen by the readiness with which the Normans abandoned their mother tongue in so short a period as fifty years after they settled in France,† and, further, in its gradual extension over many countries on the French border where tongues of German origin formerly prevailed. But in England other causes were at hand to render its extension more easy. The numerous Teutonic races who had invaded England—the Angles, Saxons, Jutes, Picts, &c.—had all dialects—some distinct languages of their own: with all these was incorporated the Celtic tongue of the original occupiers of the soil; and the result was such a diversity of speech throughout the realm, that it was very difficult for the inhabitant of one province to understand the dialect of another. Chaucer, notwithstanding his bold and patriotic attempt to address his countrymen in English, seems to have been apprehensive that his volume would not be understood out of London, for he thus apostrophizes it:—

> "Read where so thou be or els sung,
> That thou beest understood God I beseech."

Happily, the Teutonic element has maintained its supremacy in the language of England, but the influence, and, I may add, beneficial influence, of the Norman dynasty, over the speech of their subjects, may be seen in this, that French still constitutes one-sixth part of the language of the Anglo-Saxon race.

* Conquête de l'Angleterre, vol. iv. p. 371, 4me ed.

† Within one century of the establishment of the Normans in France, the Danish language had become extinct. "A Rouen même, et dans le palais des successeurs de Rou, on ne parlait d'autre langue au commencement du onzième siècle, que la langue romane ou française." Thierry, Hist. du Conquête de l'Angleterre, vol. i. p. 209.

But the most remarkable example in history of the direct agency of government in introducing a common tongue as an instrument of civilization, is furnished from South America. Mr. Prescott, in relating the policy of the Incas, writes as follows:—

"Another expedient was of a bolder and more original character. This was nothing less than to revolutionize the language of the country. South America, like North, was broken up into a great variety of dialects, or rather languages, having little affinity with one another. This circumstance occasioned great embarassment to the government in the administration of the different provinces, with whose idioms they were unacquainted. It was determined, therefore, to substitute one universal language—the Quichua,—the language of the court, the capital, and the surrounding country,—the richest and most comprehensive of the South American dialects. Teachers were provided in the towns and villages throughout the land, who were to give instruction to all, even the humblest classes; and it was intimated at the same time, that no one should be raised to any office of dignity or profit who was unacquainted with this tongue. The Curacas, and other chiefs, who attended at the capital, became familiar with this dialect in their intercourse with the court, and, on their return home, set the example of conversing in it among themselves.

"This example was imitated by their followers, and the Quichua gradually became the language of elegance and fashion, in the same manner as the Norman French was affected by all those who aspired to any consideration in England after the conquest. By this means, while each province retained its peculiar tongue, a beautiful medium of communication was introduced, which enabled the inhabitants of one part of the country to hold intercourse with every other, and the Inca and his deputies to communicate with all. This was the state of things on the arrival of the Spaniards. It must be admitted, that history furnishes few examples of more absolute authority than such a revolution in the language of an empire, at the bidding of a master."*

III.

It was on considerations such as I have stated above, but the grounds of which I have now set forth in detail, that I ventured some years ago to throw out the following suggestion:—"It is obvious that India is greatly in need of a *lingua franca*, such as French affords in Europe, Italian in the Levant, and Malay amongst the hundreds of different

* Prescott's Conquest of Peru, vol. i. p. 73.

languages of the Indian Archipelago.* Hindustáni supplies the office in many parts of India to the northward of a diagonal line between Bombay and the Bay of Bengal, but even there imperfectly, as we find the Urdu publications of the North West almost wholly unintelligible in our Hindustáni schools of Bombay; and in the south of India a language of a wholly different family, the Tamil, supplies the place of Hindustáni. The English language, therefore, with its uniform written and printed character, and its rich and cheap literature, might gradually assume the beneficial office of a language of intercommunication between different nations, such as we have seen has sprung up spontaneously in divers parts of the world."†

The spontaneous movement in favour of English, which I there alluded to, may even now be seen to be in operation in various parts of India. It will be familiar to most of those who hear me that the Natives of Bombay who are acquainted with English rarely communicate with one another in writing except in that language. The defective nature of the Native cursive character, the *mod* or *mor* of the Maráthi—indeed of most Native writing, in which the tendency to leave out vowel points is so general,‡ leads, no doubt from the dictates of convenience, to the employment of the more distinct and uniform English character. But, for speaking also, if an educated Native at the present day arrives from Upper India, from Bengal, or from Madras, there is no language in which he can make himself so readily intelligible to an educated Native of Bombay as English, and it is the only language which a Native would think of employing if he were writing to a Bengáli friend at Calcutta, or to a Tamil at Madras. In addition to this use of English which mutual convenience dictates, something of the same principle which led the Anglo-Saxons to affect the French language as a mark of education and refinement, may be seen largely at work amongst our educated Native youth, both at Bombay and in Bengal.

It is the observation of slight indications such as these that should suggest to the legislator how far he may exert himself in his proper province with effect. A saying is attributed to Augustus, that with all the power of the Roman empire he could not succeed in introducing a

* See W. von Humboldt's work on the Kawi language of Java.

† Minute on the State and Prospects of Education in Bombay.

‡ Lieut. Burton, who is a wit as well as a philologist, thus describes the written language of the Sindhian Banyans:—"A system of stenography which admits none but initial vowels, and confounds the appearance of nearly a dozen distinct consonants."—*Sciude, or the Unhappy Valley*, vol. i. p. 239.

new word into the Latin language; and our Indian experience may teach us how futile the acts of legislation frequently are when they clash with old-established habits and prejudices. But when the interests of mankind, or of a large portion of mankind, are concerned, then the statesman who is able to discern the tendency of his age may be able to introduce great changes without difficulty, and to make an indelible impression on the character of the people over whom he is placed as a ruler. No one, I presume, would imagine that an enactment, even under the penalty of death, that Marwádi traders should keep their accounts in English, and write to one another in round German text, would be anything but inoperative; but a government regulation that every candidate for office should be able to pass an examination in English would, in the course of a year or two, fill every cutcherry throughout India with well qualified candidates *(umedwárs)*, who would cheerfully bring themselves up to the required standard. Above all, the language of public business in every country should be the language of the governing authority. It is a surrender of an instrument of power to forego the use of the mother tongue on all solemn occasions, when so much depends on the exact meaning of the words employed, more especially in a country like India, where the languages are so diverse, and where everything is recorded. So well is this understood in Europe, that the French language, which was formerly used by convention (in succession to Latin) as the language of diplomacy, is now abandoned in all solemn memorials, and each nation expresses itself in its own tongue. The Moguls in India maintained Persian as the language of business, and the deep root which the study of that language has thereupon struck in the habits and customs of the inhabitants of Upper India may be clearly seen in the statistical accounts of the North-west Provinces, published by the present Lieutenant Governor, Mr. Thomason, and is another example of the great influence exercised by government over speech. The Maráthas, in like manner, introduced their own language as the language of business, and I have above pointed out the tendency of this institution to attract attention to the language amongst the Canarese-speaking subjects of the Marátha empire. The British Government has very wisely abandoned the use of the Persian language, which is neither the mother tongue of the governing body nor of the people, but in failing to substitute English as the language of record, they have voluntarily interposed an obstacle to the introduction of good government, and have possibly benefitted no one by the act.

But these are topics which it would be unsuitable to press further on

a literary Society. There are subjects, however, in which the interests of literature are so blended with political considerations, that it is impossible to sever them; and language, especially language in India, belongs to this class. In dealing with any question in which the interests of a hundred and forty millions of mankind are concerned, the more attentively the state of present circumstances is considered, so much the more forcibly do visions of the future present themselves. At no previous period of the world's history was India ever held together by such a unity of sway as at the present moment; and at no previous period were large views, embracing her future welfare, so capable of being applied. To the British in India is committed the task of communicating the civilization, the results of science, and the mental energy continually aiming at improvement, which distinguish modern Europe; and in a Society like this, composed of Englishmen, and of men of letters, it may fairly be asked whether any such instrument presents itself for accomplishing these noble ends, as the English language? It is not given to man to penetrate deeply the misty future, and it is impossible to predict what the connection of Europe with Asia may be some centuries hence; but as every Englishman who is jealous of the honour of his country must desire that the name of England, as an enlightened benefactress, should be irrevocably blended with that of India, a British monument, more useful, possibly more permanent, than the pyramids, may be left in the country, but it shall be altogether moral, and not composed of brick or marble.

> "Her monument shall be (some) gentle verse,
> And tongues to be *(her)* being shall rehearse,
> When all the heathens of this world are dead."

And, not impossibly, this monument may be the very language, deeply rooted in India, of our national poet, who continues:—

> "(*She*) still shall live, such virtue hath (the) pen,
> Where breath most breathes, even in the mouths of men."

OF THE BOMBAY BRANCH OF THE ASIATIC

ART. II.—*Comparative Vocabulary of Non-Sanscrit Primitives in the Vernacular Languages of India.* By the Rev. J. STEVENSON, D. D.

Presented August 1852.

PART II.

In presenting this second part of my vocabulary to the Society, bringing it down to the end of the vowels, few remarks additional to those I have already made are required. There are many roots, no doubt, in the Southern family that cannot be traced into the Northern languages; but I trust I have succeeded in explaining the origin of many Hindustani, and more Maráthi words from the Canarese and Támil. From Crawfurd's Malay Dictionary, kindly lent me by Sir Erskine Perry, I have pointed out several Támil words that have found their way into the Malay, if they be not originally common to the two languages.

There is, in the part before published, the following important agreements:—CAN, agalu, *to dig;* MAL, gali, *to dig;* CAN, adayu, *to be, to have:* and TAM, adai, with the MAL, ada, *to be, to have;* TAM, ati *delay;* MAL, anti, *to cease.*

In a few of the instances of agreement I have traced between the Northern and Southern families, I scarcely feel satisfied on a revision; but as there are, even in those cases, some points otherwise philologically important, I have allowed them to stand. In the great majority of instances, I feel persuaded that the analogies, when duly considered, will be found real. I have frequently had occasion to remark the difficulty on this subject that arises from the introduction of vernacular words into the Sanskrit by poets, to meet the requirements of their verse, and their embodiment in the dictionaries, through the industry of the lexicographers. But I now find my way more easily in these cases, by attending carefully to the connection of such words with others. If there be a word wholly isolated in the Sanscrit, derivable from no root, and having itself no derivatives, yet easily connected with a Támil or Canarese root, from which a variety of words are found to be derived in the Southern tongues, I set it down as a borrowed word.

COMPARATIVE

Of Non-Sanscrit Primitives of the chief

No.	CANARESE.	TA'MIL.	MALAYA'LIM.	TELINGA.
23	अड्डी Addi Obstacle Obstructio	अडकम् Adakam Restraint, subordination Continentia, subjectio	अटेञ्चिन् Atenchin Obstruction Impedimentum	अड्डि Addi Opposition Impedimentum
24	आडके A'duke Calumny Calumnia	अल्ल; अल्लगल् Alla; algal It is not; deficiency Non est; defectus	अळीकम् Aḷikam Falsehood Mendacium	अळीकमु Aḷikamu A falsehood Mendacium
25	अणक Aṇaka Private, compact Secretus, compactus	अणी-क्रदु Aṇi, krhadu To embrace, to tie Amplecti, vincire	अटिमुग, कुन्नु Aṭimuga, kunnu To undergird Succingere	अणङ्गु Ananggu To be pressed down Deprimi
26	अनकु; अतुकु Ataku; atuku A patch; to join Assumentum; conjungere	अतु; तैतल Atu; taital A stitch; sewing Sutura	तैप्प Taippa Sewing Consutura	अतुकु Atuku To be joined, a patch Conjungi, assumentum
27	अत्ते Atte A mother-in-law, a sister-in-law Mariti mater, glos	अत्तै Attai A mother-in-law, an aunt Mariti mater, amita	....	अत्त Atta A mother-in-law, an aunt Mariti vel uxoris mater

No. 23 is closely allied to No. 13, which see. Perhaps originally this was the transitive, and the other the intransitive form of the root, the former meaning obstruction without agency, and the latter implying it. The Malay *adang*, stopped in the way, is here to be added.

No. 24.—The Hindoostáni and three of the others here are Sanscrit words, if the Sanscrit word itself, as I suspect in this instance, has not been borrowed from the vernaculars, and originally derived from the Tamil अल्ल, the negative verb of common use in that and the Malayalim language.

No. 25.—The Gujarathi word here is also Maráthi.

No. 26.—We have here a striking connection for the words meaning *a patch* ON A GARMENT, running through all the languages but the Singhalese, where the cognate word means *patch* in the sense of a *spot*, &c. It is hardly necessary to say that the Sanscrit roots अति and टक्कि *to bind*, have not been considered sufficient to account for these words. They are much more naturally derived from the Canarese; and the Sanscrit radical अ is not that I have seen ever dropped in Hindi and Maráthi, so as to allow of the derivation being made from the first; nor is the Sanscrit initial ट capable of becoming त Besides, no Sanscrit words in any such sense as *patching* or *sewing* are derived from either of these roots. The Canarese अ, on the contrary, is

VOCABULARY

Vernacular Languages of India.

SINGHALESE.	MARA'THI'.	GUJERA'THI'.	HINDI'.
අඩු	अड	અડ	अड
Adda	Aḍ	Aḍ	Aḍ
Deficient	Obstruction	Obstruction, obstinacy	Contrariety
Imperfectus	Impedimentum	Obstructio, pertinacia	Contrarietas
අලීක	आळ	અલ	S अलीक
Alika	Aḷ	Al	Alík
A falsehood	Calumny	Injury, harm	Falsehood, unreal
Mendacium	Calumnia	Injuria	Mendacium, falsus
අඩංගුව	अडस	અડચણ	अण्टना
Adanguva	Adas	Aḍchan	Aṇtna
Humbled; containing	Tightly, compactly	Confinedness	To be tightened, to be contained
Depressus; capax	Arctè, compressè	Compressio	Comprimi, contineri
තික්. තීත	थिगळ	થિગલું	थेगली
Tik, tita	Thigaḷ	Thigaluṅ	Thegali
A spot, a freckle	A patch	A patch (of cloth, &c.)	A patch (on a garment)
Macula, lentigo	Assumentum	Assumentum	Assumentum
අත්තා	आत	.....	.....
Attá	Ata	.....	.....
Maternal grandmother	A paternal aunt	.....	.....
Materna avia	Amita	.....	.....

often dropped, and ත easily passes into ථ, while the ලු is a common termination for nouns. The English *tack* and the French *attacher* are no doubt connected with this Canarese word; and probably the Malay *tampal*, a patch.

No. 27.—The Sanscrit अत्ता, *a mother, an elder sister, a maternal aunt*, would sufficiently account for these words, if it were unquestionably Sanscrit; but being uncommon, except in theatrical compositions, which admit of great latitude in their vocabulary, it is probably derived from the vernacular tongues. The wide diffusion of the meanings *a mother-in-law* and *paternal aunt*, which do not exist in the Sanscrit, and the non-occurrence of the meanings *mother* and *elder sister* favour this idea. The English *aunt* and German *tante* are no doubt connected with this number, as may perhaps also the Hindi and Persian *(átá)* آتا, *a father*, also perhaps आतू, *a governess*.

N. B. අත්ත (*atta*) there, in Canarese, and the corresponding words in the other languages, are too nearly allied in sound and sense to the Sanscrit अत्त (*atra*) here, to suit our purpose, though they may be independent of it. The same is the case with අදුචු and අදවු *(adachu* and *adavu)* to press down or humble, which may be derived from the Sanscrit अधः (*adhaḥ*) down, and possibly also අදු (*addu*) to dip, to dye. So likewise the pronoun අදු (*adu*) is almost the Sanscrit अद्: *this* or *that*.

No.	CANARESE.	TA'MIL.	MALAYA'LIM.	TELINGA.
28	आनु; आने Anu; ane To support; an elephant Sustinere; elephas	यानै Yánai An elephant Elephas	आन A'na An elephant Elephas	आनु Anu To recline, to bear Inniti, sustinere
29	अप्पा Appá Father, sir Pater, domine	अप्पन् Appan Father, sire Pater, domine	अप्पन् Appan Father, sir Pater, domine	अप्प, अब्ब Appa, abba Father, esquire Pater, eques
30	अप्पड Appad A fried cake Laganum	अप्पम् Appam Bread Panis	अप्पम् Appam Bread Panis	अप्पडमु Appadamu A pancake Laganum
31	अबुक्कु; बुक्कणि Abuku; bukkani To press down; a powder Deprimere; pulvis	....	....	अबक; बुक्क Abaka; bukka A ladle; a powder Spatha; pulvis
32	अब्ब Abba O strange, alas Papae, eheu	अप्पा Appa Strange, alas Papae, eheu	अप्पा Appa Ah, oh Eheu, oh	अब्बब्ब Abbabba Strange, alas Papae, eheu
33	अम्म, अय्य Amma, avya Mother Mater	अम्मै; अम्मा Ammai, ammá Mother, mamma Mater, mamma	अम्म Amma Mother, madam Mater, domina	अम्म Amma Mother, madam Mater, domina

No. 29.—अबा is also a Scindian word for father. In the Himalayim Bode the word is *áyá*, in the Dhimal *amma*. Among four Yeniseian tribes the word used is *am* or *ama*, according to Klaproth; and this number is, too, evidently the same with the Aramean *abba*, to require attention being drawn to it. The Malay has *abang* for our sir, or sire. Among the Siberian Tartars *ab* and *obo*, according to Klaproth, are used for father. The Coles use *apai*; the Himalayan Lepchos, *abos*; the Bhotiyas and Murmis and Dhimals, *aba*; the Bodas, *ápha*; while on the Malabar coast in Tulu, *appe* means a mother; and among the todas on the Nilgherry Hills *aph*. This number then is an example of a decidedly aboriginal Indian word.

No. 30.—This number in the South seems a non-Sanscrit word for *bread*, but is, as we come North, confounded with the Sanscrit अपूप, which perhaps is derived from the same source.

N. B. The Canarese अप्पन *(appana)* for tax, and other words in the Southern tongues of the same sense, seem connected with the common Sanscrit root आप (*ápa*) to obtain, and are therefore omitted.

No. 31.—बुक्क in Sanscrit means *to bark, to speak, to give pain*. None of the derivatives have any close relation to the last sense. It is true that a blow with the fist will generally give pain; still no one would consider to give pain and to beat as synonymous expressions. But perhaps *beating* is the true meaning of the word, from which the noun बुक्क: for *the heart*, is ultimately derived.

SINGHALESE.	MARA'THI'.	GUJARA'THI'.	HINDI'.
अयतु	अनदू	.....	S आनदू
Ayatu	Andu	.....	Andu
An elephant	An elephant's chain	.....	A chain to tie an elephant
Elephas	Elephantem vinciens catena	.....	Elephantem revinciens catena
अप्पा	आपा, आबा	.....	आपा ; आप
Appá	Apá, ábá	.....	Apa; ap
Father	Sire, esquire	.....	An elder sister ; his honor
Pater	Pater, eques	.....	Sor. maj. natu ; eques
S अपूप	अपूप	.....	.....
Apúpa	Apúpa	.....	.....
A thin cake	A pancake	.....	.....
Laganum	Laganum	.....	.....
.....	बुका ; बुकी	.....	बुकनी ; बुक्का
.....	Buka ; buki	.....	Bukni ; bukka
.....	A powder; a blow with the fist	.....	Powder ; a handful
.....	Pulvis ; colaphus	.....	Pulvis ; manipulus
.....	अबब	.....	अबे
.....	Ababa	.....	Abe
.....	O strange	.....	Sirrah
.....	Papae	.....	Improbe
अम्मा	आयो ; आया	.....	आया
Ammá	A'yí ; áyá	.....	A'yá
Mother	Mother ; a dry nurse	.....	A dry nurse
Mater	Mater ; nutrix	.....	Nutrix non lactescens

No. 32.—In the Canarese some nouns are derived from this interjection.

No. 33.—This word is probably the same as the Sanscrit अम्बा *a mother*, but there can be as little doubt that it is not an original Brahmanical word, but introduced from the populace along with the bloody superstitions of Durga, whose name alone in Sanscrit and Hindi it properly is. The proper Sanscrit is मातृ for *mother*. This word then leads to the Arabic أم *a mother*, امت *a nurse*, a word which in the form of *amah* is common for a wet-nurse in India. अमा in Maráthi nursery language means *a mother's breast*. In Scindian both अमा and आई are used for mother; *ama* is also used in Malay.

N. B. The Canarese अयिलु *foolishness*, is most probably derived from the Sanscrit उलूक *an owl*, in the same way as the Hindi उल्लू which means an *owl*, and figuratively, *a fool*. Also अरनु *to decoct*, may be derived from अर्क, *essence obtained by decoction*, &c. अरलु *to blossom*, has no evident connection. The nearest word in the Sanscrit is अलक *an eyelash*, but it can hardly be derived from it. अरस *a king*, is, I believe, nothing more than the Sanscrit राजा; the word is derived from the Tamil. In that language ज becomes स as a general rule, and the prefixing of अ has already occurred to us several times, and is a very common thing, as well as the shortening of the vowels. It may still be from the Canarese आरिसु *to choose*.

No.	CANARESE.	TA'MIL.	MALAYA'LIM.	TELINGA.
34	अरि; अरह	अर्रि – ग्रदु	अर्रियुन्नु	अरयु
	Ari; arahu	Arhighradu	Arhiyunnu	Arayu
	To know; to inform	To know	To know, to comprehend	To inquire
	Noscere; narrare	Cognoscere	Noscere, intelligere	Exquirere
35	अरुचु, अरुसु	अरत्तल्, अरवम्	अरवम्	अरर्चु
	Aruchu, arusu	Arattal, aravum	Aravam	Arhachu
	To bawl, to call out	Clamour	Sound, noise	To roar, to clamour
	Clamare	Vociferatio	Vociferatio	Vocem edere
36	अर्रि	अर्र्म, अळि	अज्ळक; अलिव	अर्मिलि, अलुं
	Arhi	Arham, aṭi	Aghka; aliva	Armili, arlu
	Love, fondness	Virtue, compassion	Beauty; compassion	Love, affection
	Amor, blandimentum	Virtus, benevolentia	Pulchritudo; misericordia	Amor, desiderium
37	अलगु, अलुकु	अलप्पु	अलयुन्नु	अलकु
	Alagu, aluku	Alaipu	Alayunnu	Alaku
	To shake, to quake	Agitation, vexation	To be agitated	Fear, terror
	Vibrare, tremere	Tremor, angor	Contremere	Metus, tremor
38	अलि; अले	अलै	अल; अलकटन्	अल
	Ali; ale	Alai	Ala; alakatan	Ala
	To wander; a wave	The sea, a wave	A wave; the sea	A wave of the sea
	Vagari; fluctus	Mare, fluctus	Fluctus; mare	Fluctus
39	अळङ्ग.; अलति	अलङ्ग.म्	.....	अलङ्ग.मु
	Aṭanga; alati	Alangam	.....	Alangamu
	A rampart; a measure	The wall of a fortress	.....	A rampart
	Vallum; mensura	Agger	.....	Vallum

No. 34.—This word hardly travels into the Northern tongues, though with its derivative so common in the Southern. The harsh *rh* of the Tamil is, when doubled, pronounced like *tt*, hence the comparison with the Hindi; but see No. 27, where there is given another connection.

No. 35.—This number is no doubt connected with the particle अरे found in most of the languages, and also in the Sanscrit dictionaries, and used as an interjection in *calling to* or *addressing* inferiors. In Sanscrit it is all isolated and alone; in the Southern vernaculars it is connected with a large class of words, having the sense of *calling*, and the Malay arip, *to scream*. In Maráthi रडणे evidently from the Sanscrit रुदन is used in the sense of *weeping*; but it is never interchanged with the words of this number where the initial vowel is evidently radical.

No. 36.—This is a very satisfactory series. The first Singhalese, of which the meaning is the most remote, is derived from a verb that means *to lay hold of*, and has a compound meaning, *courtship*; it has also आलि in the very same sense as the Hindi, and there can be little doubt that this last word has found its way into Sanscrit books from the vernaculars.

Nos. 37 and 38.—I am not sure that I ought to have separated these two numbers, as vibratory motion is intimately allied with that of the waves of the sea. It gives me, however, the opportunity of bringing out the connection between all the different vernaculars more thoroughly. There is to be added to No. 37 the Bengáli *hila* and the Uriya *halibára*, the Punjabi *hilauna*, and perhaps the Burmese *iloh-the*; at any rate the Javanese and Malay *alih*, to move, to migrate. The nearest Sanscrit root is चल *(chal)*, which means the same thing, although there may be here such a connection as

SINGHALESE.	MARA'THI'.	GUJERA'THI'.	HINDI'.
.....	.....	.....	आतू
.....	.....	.....	A'tu
.....	.....	.....	A female teacher
.....	.....	.....	Institutrix
अरगलय	अरड, ओरड	.....	.....
Aragalaya	Arad, orad	.....	.....
Noise, tumult	Bawling, noise	.....	.....
Clamor, strepitus	Vociferatio	.....	.....
अल्ला ; आलै	आळ, आळि	आळ	आलि
Alla ; alai	A'ḷ, áḷi	A'ḷ	A'li
Nearness ; desire	A longing after	Fondness	A woman's female friend
Propinquitas ; desiderium	Desiderium	Blandimentum	Feminæ amica
अल्लनवा	हलणे, हिलणे	हालवुं	हालना
Allanavá	Halaṇe, hilaṇe	Hálavun	Hálaná
To put in motion	To shake	To shake	To shake
Agitare	Vibrare	Vibrare	Vibrare
अलञ्जर	हेलकावा	.....	हलोरा
Alanjara	Helkává	.....	Halorá
An earthen water-pot	A wave	.....	A wave, billow
Vas fictile	Fluctus	.....	Fluctus
.....	अलङ्ग.	.....	अलङ्ग.
.....	Alanga	.....	Alanga
.....	A long building	.....	A side, entrenchment
....	Stabulum, &c.	.....	Latus, agger

may exist among languages of different families; there can be no such thing as derivation, for no example can be pointed out either of the dropping of an initial च, or of changing it into ह. The nearest Sanscrit for a wave is लहरि, but here also derivation is out of the question. The exceptional word हल्लन, found in Wilson's second edition, with no other words in the least connected with it, and translated "rolling or tossing as in sleep," has no doubt been adopted by some Sanscrit writer from the vernaculars; but though No. 37 were on the ground of this word given up, the remarkable agreement in No. 38 in the spoken tongues, without any corresponding Sanscrit word, will still remain a remarkable coincidence, only explainable from the existence of a non-Sanscrit basis. *Alih* in Malay means to move, to migrate. Compare also the Greek ἅλος, the *salt sea*, with the Tamil.

No. 39.—Perhaps the Maráthi points out the derivation from the Canarese of the word for a rampart: it may thus be ultimately connected with the Latin *longus*, and the Sanscrit लम्ब, but the sense of a *rampart*, which it bears in the South, and *military intrenchment* in the Hindustáni, without any such meaning belonging to any derivative of लम्ब in Sanscrit, as may be supposed to take place from the Canarese अलति, plainly shows an original and independent connection between the Northern and Southern vernaculars. We may often find an original connection between words in languages of different families, owing to the influence of a primitive tongue from which all are descended, if such a tongue there was, or from unknown circumstances. All we contend against in such instances is, that the words have been borrowed on either side. The word *alang* in Javanese means *a cross*, in Malay *a cross-beam* and a *sand-bank*, but not a *rampart*.

No.	CANARESE.	TA'MIL.	MALAYA'LIM.	TELINGA.
40	अव; अवन Ava; avana He, that; his Ille; suus	अवन् Avan He, that Ille	अवन् Avan He, that Ille	अयन Ayana He, (honorific) Ille (honorificè)
41	आवि; आविगे A'vi; ávige Steam; a potter's kiln Vapor; fornax	आवि Avi Vapour, smoke Vapor, fumus	आवि Avi Vapour Vapor	आवि; आवमु A'vi; ávamu Vapour; a kiln Vapor; fornax
42	आयु A'yu To choose Deligere	आवनम्; आवल् A'vanam; àval Intimacy; longing Familiaritas; desiderium	आवु A'vu (interjec.) How pleasant Quam jucundè	....
43	आर A'ru To be appeased Placari	आर्; आर्-ग्रादु A'rhu, arhu-grhadu A river; to be appeased Amnis; placari	आर्, आरिक्कुन्नु A'rhu, arhikkunnu A river; to cool, to appease Amnis; restinguere	आर्; एर् A'rhu; erhu To be appeased; river Placari; rivus
44	आले A'le A press Torcular, prelum	आलै A'laí A press for sugar-canes Sacchar. exprim. torcular	आल A'la A shed for an oil press Molæ tentorium	अल्लु Allu To plait, to twist Contorquere

No. 40.—To this number add Bengáli ऊ and Hindi वु *that*, the Uriya आपण *self*, the Scindian पाण *self*, the Dhimál वा *he*; the Tibetan हु *this*, and हो *that*, are perhaps more easily connected with the Sanscrit सु, which in Uriya becomes से and तत् gives rise to the Marathi तो and Gujaráthi ते, and is connected with the Burmese *tho*. It appears to me that the original form is the Hindustáni आप. The long vowel in the vernaculars easily passes into the short, and non-initial प into व; thus in Tamil पाप becomes पाव as it does also in *Mágadhi*, see *Kalpa Sutra*. In the Maráthi and Gujaráthi आपण becomes a comprehensive plural of the first person, including all parties present. The Malay *awak*, self, is no doubt connected with this number.

N. B. आवली जावली a term of the Canarese and Maráthi, being ultimately derived from युग्म, *a pair*, is omitted; as also अश्नियु, *to be loose*, as possibly intimately connected with शिथिल *loose*.

No. 41.—Whether अवि, the word for *vapour* in the Southern tongues, be Sanscrit or not, I cannot tell. In the Tamil dictionary *wind* and *breath* are among its meanings, but the most discordant words there often obtain the same sound; as for example, there is अय *luck*, a pure Sanscrit word, and under the same heading अय *a mother*, for which see No. 33. However this may be, and whether the connection between the two meanings we have given be intimate or not, the word for a *potter's kiln* seems an unexceptionable instance of connection between the Southern and Northern families, and would imply a certain stage of civilization before Brahmanical influence was

Singhalese.	Mara'thi'.	Gujara'thi'.	Hindi.
ऊ	आपण ; आपला	आपणो	आप; अपना
U'	Apan ; apalá	Apano	A'p ; apna
He	Self ; ours, (honor)	Ours, (honor)	Self ; ours, (hon.)
Ille	Nos ; &c. nostrum (hon.)	Nostrum, (hon.)	Nos ; nostrum, (hon.)
.....	आवा	.....	आवा
....	A'vá	.....	A'vá
.....	A potter's kiln	.....	A potter's kiln
.....	Fornax figularis	.....	Fornax figularis
.....	आवड	.....	.....
.....	A'vad	.....	.....
.....	Love, desire	.....	.....
.....	Amor, desiderium	.....	.....
आर	विरहा	.....	आरुक
A'ra	Virhá	.....	Aruka
A stream	A brook	.....	A par. cooling drug
Rivus	Rivus	.....	Medicam. refrig.
आला	आला	अल	.....
A'la	A'la	Al	.....
Large	A tie, restraint	Injury	.....
Extensus	Ligamentum	Damnum	.....

exerted over the Indian Aborigines. The Malay and Javanese words *abu* and *awu*, for *ashes*, are likely connected with this word.

No. 42.—Seems intimately connected with No. 36. The Javanese word *ayu* handsome, is no doubt also connected with Canarese.

N. B. आलिसु *to listen*, is not connected apparently with words in the other tongues.

No. 43.— Is perhaps ultimately connected with the Sanscrit अणस् *water*, though I scarcely think it can be derived from it. In the Southern tongues *ara*, for *a river*, is a common word, and used by the vulgar in Ceylon, though quite unknown, even in the higher quarters of the Peninsula. The *med*, substance, found in the Hindí dictionary, I derive from the Southern family, and suppose it a remnant of that family which had lingered in the North. But what I want to be especially marked is, the figurative sense that runs through the Southern tongues and extends to the Maráthi, for the ळ and र are so frequently interchanged, that the use of the former is a matter of no importance. The river, *Arno*, in Italy, and the Latin *urna*, a water-pitcher, are likely connected with the Sanscrit अर्णस The *Arar* mentioned by Cæsar seems nearly the same as the South Indian word for *a river*. In Malay, *arung* means the sea, and is nearer our word than the Sanscrit *árnava*, आर्णव.

No. 44.—Though the meanings of the words under this number are rather diverse, I suppose they may be derived from one radical.

N. B. The word आवु in Canarese and Telinga, with आ and आबै in Tamil, meaning *a cow*, I cannot connect with the Northern family, nor reduce to a Sanscrit root, unless we sink the Sanskrit ग.

No.	CANARESE.	TA'MIL.	MALAYA'LIM.	TELINGA.
45	ಇಕ್ಕು, ಇರಿಸು Ikku, irisu To place, to put Ponere	ಇರುತ್ತು-ಘ್ರದು Iruttu-ghradu To place on, to press down Ponere, deprimere	ಇರುತ್ತುನ್ನು Iruttunnu To place, to set Deponere	ಇರ್ಕು Irkûku To press into Interponere
46	ಇರ Iru To be ; to remain Esse ; manere	ಇರು-ಕ್ರಾದು Iru-krhadu To be, to remain Esse, manere	ಇರಿ-ಕುನ್ನು Iri-kunnu To be, to remain Esse, manere	....
47	ಇರ್, ಎರಡು Ir, eradu Both, two Ambo, duo	ಇರು, ಇರಂಡು Iru, irandu Both, two Ambo, duo	ಇರು, ರಂಡ Iru, randa Both, two Ambo, duo	ಇರು Iru Two, both Duo, ambo
48	ಇರಳು Iraḷu Night Nox	ಇರುಳ Iruḷ Darkness Tenebrae	ಇರಿಳು Iriḷu Darkness Tenebræ	ಇರುಲು Irulu Darkness Tenebræ
49	ಇಂಗ್ಲ Inggal Live coals Anthraces	....	ಇಂಗಾಲಮ್ I'nggálam Charcoal Anthrax	ಇಂಗ್ಲಮು Inggalamu Fire, charcoal Ignis, anthrax
50	ಇಳಿ Iḷi To descend ; to halt Descendere ; sistere	ಇಲ್, ಇಳೈ Il, iḷai Not to be ; consumption Non esse; pthisis pulmonalis	ಇಟಿಯುನ್ನು Iṭiyunnu To fall to pieces	ಇಲುಗು Ilugu To die Mori
51	ಇಳಿಗಿ I'ḷigi A sickle	....	ವಿಳ್ಳ Villa A bow ; a steel spring	ವಿಲ್ಲು Villu A bow .....

Nos. 45 and 46 are intimately connected. ಇರ is in sense the अस of the Sanscrit, and not the भू; the *esse* or *existere* of the Latin, and not the *fieri ;* the *be* and not *become* of the English. The latter of these senses belongs to the South Indian अक्कु, given above.

No. 47.—Contains the common word for *two* in the Southern tongues and an uncommon word in the Singhalese. The Maráthi word seems evidently connected with the others. The word ಎರ indeed is uncommon, and ದುಸರಾ from the Sanscrit is used both for *other* and *second*. I cannot think that ಎರ is derived from ಇತರ. The ತ would not have been thus dropped.

No. 48.—The Maráthi word means also *rosin*, the Sanscrit राल; but it is easier

SINGHALESE.	MARA'THI'.	GUJARA'THI'.	HINDI'.
.....	रुतणे	.....	.....
.....	Rutane	.....	.....
.....	To run into	.....	.....
.....	Penetrare	.....	.....
इरियद्दव	एरी, एरवी	.....	.....
Iriyadvava	Eri, eravin	.....	.....
Existence; position	Spontaneously	.....	.....
Existentia; situs	Sponte, ultro	.....	.....
इरणट्ट	एर	.....	.....
Iruntata	Er	.....	.....
Two, double	Other	.....	.....
Duo, duplex	Alius, alter	.....	.....
.....	राळ	.....	.....
.....	Raḷ	.....	.....
.....	Ruined, disgraced	.....	.....
.....		.....	.....
.....	इङ्गळ	इङ्गारा	.....
.....	Inggaḷ	Inggará	.....
.....	A live coal	Live coals	.....
.....	Anthrax	Anthraces	.....
.....	इल्ला	.....	.....
.....	Illa	.....	.....
.....	Consumption; exhaustion	.....	.....
.....	Consumptio	.....	.....
.....	इळा, विळा	.....	.....
.....	Iḷa, viḷa	.....	.....
.....	A sickle	.....	.....
.....	.....	.....	.....

to derive the meaning given from *night* than from *rosin*, unless *pitch* be the common idea, and the Sanscrit राल, also derived from the Southern tongues.

No. 49.—This word is put down in most of the dictionaries as derived from the Sanscrit अङ्गार *a live coal*, but in Maráthi the pure Sanscrit word is quite common, and not another instance can be given of such a conversion. The genius of the language is to lengthen and not to shorten, and the corruption of अंगार is आंगार. इङ्गल then is an aboriginal word. The Hindi follows the Sanscrit, and the Gujárathi is influenced by both. *Ingle*, in Lowland Scotch, means *a blazing fire*.

No. 51.—There is a Sanscrit word इल्लि said to be *a small sword*, but possibly after all derived from the vernaculars, in which the leading idea is *a hunt instrument*.

No.	Canarese.	Ta'mil.	Malaya'lim.	Telinga.
52	उक्क,	उक्कम्	S.उष्मम्	ऊक्क
	Ukku	Ukkam	Ukhyam	Ukka
	To boil, to seethe	Sultriness	Boiled	Sultriness
	Bullire, coquere	Æstus	Coctum	Æstus
53	उप्पु; उप्पळ	उप्पु ; उप्पळम्	उप्प	उप्पु
	Uppu ; uppuṛ	Uppu ; uppalam	Uppa	Uppu
	Salt ; quicksand	Salt ; a salt marsh	Salt	Salt
	Sal ; syrtes	Sal ; æstuarium	Sal	Sal
54	उप्पे; ओप्प	मरवुप्पु ; ओप्पु	ओप्पम्	ओप्पु
	Uppe ; öppa	Maravuppu ; öppu	öppam	öppu
	Steaming in lye-water ; pretty	Potash ; beauty	Polishing	Beauty
	Lixivia dealbare ; nitius	Sal lixivius ; splendor	Politura	Splendor
55	उब्ब	उप्पुग्रदु	.....	उब्ब; उब्बु
	Ubba	Upugrhadu	.....	Ubba ; ubbu
	To swell	To swell	.....	Great moist heat ; to swell
	Turgere	Turgere	.....	Æstus ; tumor
56	उमे	उर्हगल	उर्हक्कम्	उरक
	Ume	Urhugal	Urhákkam	Uraka
	Mute, dumb	Tightness	Sleep, rest	Silently, quietly
	Mutus	Constrictio	Sopor, quies	Tacitè, placidè

No. 52.—The Malayalim and Singhalese words are both found in the Sanscrit, as well as in several of the vernacular dictionaries. The proper corresponding Sanscrit word, however, is क्वथ, which though allied with, can hardly be called the root of our words.

N. B. The Canarese उगि *to spit out*, may be derived from the Sanscrit उद्ग *to cast off*. The Canarese उण्डे and Tamil उण्डै *a ball of anything*, the Maráthi उण्डा *a lump of dough*, are connected with the Sanscrit उण्डेरक *a ball of flour*, and are omitted though probably here also the Sanscrit is the derivative. The Canarese उण्ण *to eat*, I derive from अन्न as उन्न.ट from अंगुष्ठ, &c. In Maráthi and Canarese we have a curious word, उचापत *lifting goods on credit*, probably from उच्च; also Canarese उज्ज *a pair, or match*, perhaps from उभय or युज and उड्डु *the lap*, from उच्चय.

No. 53.—I feel now doubtful of the connection between the two Canarese words in the first column. I thought the Tamil word for *a salt marsh* might be the link, but perhaps such a Sanscrit word as उप्पलवन may be the original, whence the Maráthi and second Canarese are deduced. There is a Sanscrit word for *condiments*, उपस्कर which cannot have any connection with this word, as उप is the prepositive.

SINGHALESE.	MARA'THI'.	GUJARA'THI'.	HINDI'.
S.उखा	उकडणे	ऊकरवु	उकलना
Ukha	Ukaḍane	Ukaravu	Ukalana
A saucepan	To boil, to seethe	To boil, to be hot	To boil
Anthepsa	Coquerè	Ebullire, fervere	Coquere
.....	उपळ	.....	.....
.....	Upaḷ	.....	.....
.....	Marshy ground	.....	.....
.....	Pratum palustre	.....	.....
ओपन-गनवा	ओप	ओपणी	ओप
Ōpana-gavaná	Ōp	Ōpaṇi	Ōp
To polish	Polishing, bleaching	A burnisher	Polish, lustre
Polire	Politura, dealbatio	Politor	Politura, nitor
.....	ऊब; उभड	उभरवूं	उभ; उभरना
.....	U'b; ubhaḍ	Ubharavun	Ubh; ubhurná
.....	Sultriness; gushing out	To swell	Moist heat; to swell
.....	Æstus; profluvium	Tumere	Æstus; turgere
.....	उगा	उग्ग.	उंङ्घ
.....	Uga	Ungga	U'nggh
.....	Silently, still	Sleep, rest	Nodding, sleeping
.....	Tacitè, placidè	Sopor, quies	Dormitans

No. 54.—The connection of the two words in the Canarese is presumed from the ease with which the *u* and short *o* pass into one another. The word उप्पु like our word *salt*, is applicable to all saline bodies, and to potash among the rest. Hence we get the sense of bleaching cloth, and next of rendering other articles brilliant. This is a widely diffused and important aboriginal word, extending even to the Malay, which for *polish* has *upam*. It is a defect in the Devanágari alphabet that it makes no distinction between the long and short *e* and long and short *o*.

No. 55.—Perhaps the word for *moist suffocating heat*, which occurs in some of the languages, may not be derived from the word *to swell*, though the heat meant is that which makes seeds germinate, trees bud, &c. The Malay *aba*, to glow, or to feel warm is likely connected with this number.

No. 56.—The meanings in the members of this series are pretty close, but the forms are not so close as usual.

N. B. The harsh *r* sometimes written *rr* will henceforward be written *rh*.

N. B. The Canarese उरि *blaze, flame*, &c. is probably continually connected with, if not derived from वह्नि; in the sense of *fire, flame*, &c., and both with the Hebrew אור *ur*, fire.

No.	CANARESE.	TA'MIL.	MALAYA'LIM.	TELINGA.
57	उरलु	उर्रकम् ; उरपु	ऊरुन्नु	ऊरलु
	Uralu	Urakam ; urapu	U'runnu	U'ralu
	To roll ; to die	Descent ; death	To pull off	To roll ; to fall down
	Volvere ; mori	Descensus ; mors	Extrahere	Volvere ; cadere
58	उलट	उळि	उलयुन्नु	उलुगु
	Ulaṭa	Uṭi	Ulayunna	Ulugu
	Topsyturvy	Disgrace	To move ; to be reduced	To die
	Inversè	Infamia	Movere ; reduci	Mori
59	उल ; उलि	उज्ळु-ग्रदु ; उळी	उज्ळव ; उळी	उलि
	Ulù ; uli	Uzhu-grhadu ; uli	Uzháva ; uṭi	Uli
	To plough ; a chisel	To plough ; a chisel	Tillage ; a chisel, a barb	A chisel
	Arare ; scalper	Arare ; scalper	Agricultura ; scalper, spiculum	Scalprum
60	ऊळिग	उज्ळ-क्रदु	उज्ळकलम्	उलाकु
	Uṭiga	Uzha-krhadu	Uzhkalam	Ulaku
	Service ; items	To suffer ; to apply the mind	Retinue, insignia	A mem. of goods
	Labor ; articuli	Pati ; studere	Pompa, regis insignia	Bonorum schedula
61	एक्कताळि	एक्कचक्कम् ; एक्कर्	एक्कञ्चक्कम्	एक्किरिन्त
	Ekkataṭi	Ekkachákkam ; ekkar	Ekkanchakkam	Ekkirinta
	Mocking, jeering	At random ; low language	Contention	Making faces ; derision

Nos. 57 and 58 seem intimately connected, though they appear still referable to two distinct roots. The only Sanscrit words that seem nearly connected with them are लोल *tossing, rolling,* and उलोल *a wave.* The vernaculars, however, have all the र, which the Sanscrit never has in those words, and if they had been derived from the Sanscrit, how can we account for all taking the र. The Singhalese word रय्ल *rael,* meaning *a wave,* is probably also derived from the same source. The commonness of many of the words in the list, and the number of derivatives in use, show these to be no exceptional or foreign vocables, but genuine members of the aboriginal Indian tongue. The connection of the former number with our English word *roll* is not a little remarkable ; as well of *loll,* for *putting out the tongue,* with the Sanscrit लोला *a tongue,* and लोल *shaking.* The Maráthi has रोखणे for *to polish,* and रोखणी for *a carpenter's plane ;* the Hindi रुखानी means *a chisel.*

N. B. The Canarese उसबु *sand,* the Maráthi ओस *waste land,* &c., have been omitted, as nearly connected with the Sanscrit उष *saline earth,* though which is the original may still be questioned.

No. 59.—The Malayalim and Singhalese come near, both in sense and sound, to the English *awl.* It is singular to notice how the Maratha's put a क before the vowel, in the word for *a husbandman.* They also frequently change the ळ into ण. Husbandmen are called in Tamil उज्ळवोर *uzhwor.*

N. B. उलि *to be left,* in Canarese, and उरणे in Maráthi, can be derived from the Sanscrit उर्वरित ; also उळ्ळ *possessing,* from उण्टु definitive verb *it is ;* both the corresponding words in the Southern tongues have no derivative, as far as I know, in those of the North.

SINGHALESE.	MARA'THI'.	GUJARA'THI'.	HINDI'.
उलेल ; रोदल	रूळ ; रुळणे	रोलवुं	रोलना
Ulelá ; rodula	Rúḷ ; ruḷaṇe	Rolavun	Rolaná
Whirling ; a wheel	An anklet ; to jingle	To roll, to polish	To roll, to smooth
Circumagens ; rota	Annulus ; tinnire	Volvere, polire	Volvere, polire
अल्ल	उलटा	उलटुं	उलटा
Alla	Ulaṭá	Ulaṭun	Ulṭá
A waterfall	Inverse, reverse	Reverse, opposite	Reverse, contrary
Cataracta	Inversus, reversus	Reversum, adversum	Reversus, adversus
उल	उलणे ; कुळंबी	.....	उलझना
Ula	Ulaṇe ; kuḷambi	.....	Ulananá
The point of an instrument	To crack ; to split ; a husbandman	.....	To be laid on one side
Teli cuspis	Rimas agere; agricola	.....	Inclinare
उलियम	उळोग	उलझावुं	उलझाव
Uliyama	Uḷíg	Uljháwun	Uljháw
Palanquin service	A return present	To entangle	Embroilment
Sellæ pensilis portatio	Remuneratio	Implicare	Turbamentum
.....	वेंकावल्या, वेंचकुल्या	.....	.....
.....	Venkawlyá, venchkulyá	.....	.....
.....	Mimicry, grimaces	.....	.....
.....		.....	.....

N. B. The letters ऋ, ॡ, are purely Sanscrit, and do not exist in the vernacular tongues. They are merely the semi-vowels र and ल with the French *u*, a vocal sound, which is only found in connection with these two liquids, and considered by Sanscrit grammarians as vocalizing these two consonants. The Maráthi Brahmans, who have retained the different shades of sound peculiar to Sanscrit letters, pronounce as above described, or as the German *ü*. The Devanágari has but one *e* and *o*, and that long; but the Southern vernaculars have a short *e* and *o* also. The words beginning with the short *e* are often corruptions of Sanscrit words beginning with other vowels, as एंजलु *crumbs*, from उच्छिष्ट in Maráthi उष्टें and एणु *eight*, from अष्ट. Sometimes a gutteral is dropped, as from गणना *calculation*, we get एणेके, unless this be from अङ्कन. These words are accordingly all passed over. In the same way, by dropping a dental, we get the Tamil एळम् and Canarese एळ्ळु *an oil seed*; and hence एणे *oil*, from the Sanscrit तिल : and तैलं whence तेल in Hindi and Maráthi, for *oil*. It is curious that in Maráthi the त is always dropped in compounds; thus we have एरंडेल for *castor-oil*, from एरंड and तेल showing a Southern influence.

No. 61.—After two or three derivatives we have एकु to *card wool* or *clean cotton*, whether it is connected with this number or not, I do not pretend to say; perhaps it is the root whence they all come, as the Telinga एकु means both *to defame*, and *to clean cotton*.

N. B. एगटु *pungent*, is doubtless from अग्निष्ट and एगुडे *an ascent*, from अग्र. On the same principle एचर *warning*, is derived from विचार *consideration*, and so of others that I need not particularize. एचु *to shoot an arrow*, may come from आ and च्यु, and possibly एच्च *a hole*, from चिद्र. At any rate these have no correspondent words in the Northern tongues.

No.	Canarese.	Ta'mil.	Malaya'lim.	Telinga.
62	ಎಟ್ಟು, ಎಟಕು Ettu, etaku To reach Pertingere	எட்டு-ப்பது Ettu-grhadu To reach, to aim at Assequi, moliri	എടാകൂടമ് E'tákútam Hazard, difficulty Periculum, difficultas	ఎట్టకేని Ettàkeni With difficulty Vix, difficile
63	ಎಡ, ಎಡರ Eda, edara Place, abode Locus, domus	அடை; அடுபு Adai; adupu Incubation; a hearth Incubatio; focus	അട Aṭa Incubation Incubatio	ఎడ Eda Place, interval Locus, intervallum
64	ಎಡ Eda The left Sinistra manus	எண; வெர்ரி Ena; verhi Poverty; fury Paupertas; furor	വെർറിയൻ Verhiyan A madman, a beggar Insanus, pauper	ఎడమ; వెర్రిడి Edama; verhadi The left; madness Sinistra; insanies
65	ಎದ್ಚಡಕ Edachadaka Timidity Metus	எதன Etana A deceiver Fallax	ഹതകൻ Hatakan A coward Timidus	హతకుణ్డు Hatakundu A coward Timidus
66	ಎದರ; ಇದಿರ Edaru; idiru The front; presence Pars adversa; præsentia	எதிர் Edir The opposite, before Regio contraria, coram	എതിരേ Etire The opposite, before Pars contraria, coram	ఎదుర్ Edurhu The front, opposite Prima acies, contraria

No. 62.—The Sanscrit अट्ट *to surpass*, will not account for this genuine aboriginal word, which does *not go beyond* but comes up to the mark with difficulty.

N. B. एडलु to *stumble* or *strike against*, is connected with the root आड. The Canarese ಎದನ and Telinga ఎడ్డనం *obstinacy* and *severity*, and these with the Sanscrit हठ *violence*. Whether एणे *proportion*, is derived or not from गण I would not decide. In Maráthi we have उठणे *to rise*, and उतणे *to swell up*, both originally from the Sanscrit; probably thén, the Canarese ಎತ್ತು *to raise*, and the allied words are from the same source, or at least intimately connected with it.

No. 64.—Though for comparison some extraneous words have been added, I do not think it likely that they are all from the same root, though I think the roots nearly connected that designate *left-handedness* or *madness*, or *folly* or *intoxication*, all which senses the second Tamil word bears.

No. 65.—It is not probable that words radically connected, yet with such various forms, should have been derived from the Sanscrit, nor that हतक *a coward*, should have been so transmogrified. It is rather to be inferred that हतक itself is a mere

SINGHALESE.	MARA'THI'.	GUJARA'THI'.	HINDI'.
.....	अटपणे	अटपटु	अटना
.....	Atapane	Atapatu	Atana
.....	To reach, to accomplish	Difficult	To be filled up
.....	Pertingere, assequi	Difficile	Repleri
.....	अड्डा	.....	अडा
.....	Adda	.....	Ada
.....	A place where labourers meet to be hired	.....	A public place
.....	Forum	.....	Forum
.....	वेडा, डावा	.....	.....
.....	Veḍa ; ḍava	.....	.....
.....	A madman ; the left	.....	.....
.....	Insanus ; sinistra	.....	.....
हतिय	हदहदणे	.....	हदियाहा
Hatiya	Hadhadane	.....	Hadiyáhá
Panting	To tremble	.....	Timid, bashful
Anhelans	Tremere	.....	Pavidus, verecundus
एदिरी	एथे	.....	इधर
Ediri	Ethe	.....	Idhar
Against, adverse	Here	.....	Here, hither
Adversus, hostilis	Hic	.....	Hic, huc

formation from the Telinga or Malayalim than a derivative of the Sanscrit इन, from whence it could not, according to the rules of etymology in that sense, be well derived.

No. 66.—A glance at the Canarese word will show at once that we do not need to go to the Sanscrit अत्र to get the Hindi word, which by-the-bye is almost identical in meaning and sound with the English *hither*. Suppose we endeavour to derive इधर from the Sanscrit इदम् *this*, we shall not even then get the र till we go to the Canarese, the locative of which is इदरल्लि and the genitive इदर. The Maráthi never changes the Sanscrit अ to ए, and therefore must have the same origin.

This number in the Canarese and other Southern tongues has many derivatives in the sense of *opposition*.

N. B. एदे *the breast* or *heart*, is no doubt हृद्. This in Scindian assumes the Praerit form of हिंओएदु. *E'du*, a porcupine, is derived, according to the Telinga dictionary, from एदु *to protect*, which itself is connected with No. 66, which like the Greek αντι has the double reference, of *protection* and *opposition*.

No.	Canarese.	Ta'mil.	Malaya'lim.	Telinga.
67	एन्नु ; एडू Ennu ; endu To say ; to that effect Dicere ; cujus tenor est	एन्ग्रदु ; एडू Engrhadu, endu To say ; on purpose for Dicere ; idcirco	एन्न Ennu Therefore ; to that effect Idcirco ; cujus tenor est	अनु ; अनि Anŭ ; ani To say ; to that effect Dicere ; cujus tenor est
68	एल्ल Ella The whole, thorough Universus, prorsus	एल्लाम् Ellám All, the whole Omnis, universus	एल्लाम् Ellám All, the whole Omnis, universus	एल्ल Ella All Omnis
69	एळ्ळु; एलिगे Eḷu ; élige To rise ; growth, elevation Oriri ; incrementum	एऴुचि Ezhuchi Elevation, haughtiness Sublatio, superbia	एऴु Ezhu, Produce, height Fructus, altitudo	इलुकु Iluku To start Exsilire
70	एले Ele Thread Filum	एऴिनि ; एल्लै Ezhini ; ellai A curtain ; bounds Aulcum ; termini	एऴ ; एल्ल Ezha ; ella A trellis ; a boundary Cancelli ; terminus	एल्ल Ella A boundary Limes
71	ओगडेसु, ओयक्कने Ogadesu, oyakkane To vomit, to feel nausea Vomere, nauseare	ओक् कालम् Okkálam Qualm Nausea	ओक्कानम् Okkánam Squeamishness Nausea	ओकरिंचु. Okarinchu To retch Nauseare
72	ओट्टु ; ओडु Oṭṭu ; oḍu To collect together ; a tile In plicas colligere ; tegula	ओडु Oḍu A tile ; a skull Tegula ; calva	ओटिट्टुम्ब ; ओऴि Otiṭṭunna ; ozhi Tile ; a hiding-place Latebra	ओडि Oḍi The lap Sinus

No. 67.—I have given already a reason for not deriving this from the Sanscrit अण. Instead of changing ण to न, the current of the vernaculars is quite in the opposite direction; and they all mean *to say* or *tell*, but never *to sound*. The pluperfect participle also, which becomes in all of them that have the verb, a particle meaning sometimes *therefore*, and sometimes *to that effect*; and in most instances, though there was not space to note it both, is a very singular coincidence; and it is scarcely less so that the Singhalese and Malayalim which have not the verb should retain the particle, while the Maráthi, which changes the form of the verb, should change also the particle to make it assume the regular participial form. This singular idiom is scarcely capable of a literal translation into English. Thus for the phrase *he went off, saying he would return immediately*, the Maráthas would say झटकन येइन म्हणून म्हटल्यावरच गेला; literally, "*I will instantly return*," *having said, after saying, he went off*. Yet this strange idiom runs through all these languages.

N. B. If the Canarese एरगु *to bow*, and एरचु *to sprinkle*, have no connection with the Sanscrit रिंगण *creeping, as a child*, and रेचन *purging*, they have no correspon-

SINGHALESE.	MARA'THI'.	GUJARA'THI'.	HINDI'.
එනිසා	म्हणणे ; म्हणून	.....	.....
Enisá	Mhanane ; mhanún	.....	.....
On that account	To say ; to that effect	.....	.....
Idcirco	Dicere ; cujus tenor est	.....	.....
එළී	अलेल्	.....	अलम्
Eli	Alel	.....	Alam
Public	Arrant ; thorough	.....	The human race
Communis	Merus ; prorsus	.....	Genus humanum
අළියා	अळणे	अलबेला	अलबेला
Aliya	Aiane	Albela	Albela
An elephant	To attain puberty	A coxcomb	A fop, *a swell*
Elephas	Adolescere	Tumidus	Tricarum gloriosus
එළෙනවා	एलें	.....	.....
Eedenavá	Elen	.....	.....
To entwine	A thong fastoning the cart to the yoke	.....	.....
Convolvere	Jugi loramentum	.....	.....
ඔක්කාරේ	ओकणे	ओकवुं	ओकना
Okkáre	Okane	Okavun	Okaná
Vomiting	To vomit	To vomit	To vomit
Vomitus	Evomere	Vomere	Vomere
ඔඩොක්කුව	ओटी ; ओंटी	ओटलो ; ओटवुं	ओट् ; उत्तु
Odokkuva	Oti ; onti	Otulo; otavu	Oṭ ; utta
A pocket in the folds of the robe	A verandah ; the lap	A verandah ; to hem	A skreen ; plaits of cloth
Sinus	Porticus ; sinus	Vestibulum ; prætexere	Velum ; plicæ

dents in the Northern family. एल *young, tender*, is probably connected with the Mar. ओला *fresh, tender*, from S. ओल *moisture*.

No. 68.—It is singular how this word should come so near the English *all*, and the Arabic علم used in the *Urdu*. There is here no approach to the Sanscrit, yet it is a very common word in all the Southern tongues.

No. 69.—The Southern root here explains some singular words in the Singhalese and Northern family.

N. B. I cannot find any traces of the Canarese ओर् and ओनडु one, *unus*, in the Northern family, unless in No. 77, though they run through all the Southern. C.ओगि *to bleach*, may be connected with S.ओजस *splendour*. Also C.ओडु *to catch*, and allied words ; and Mar. ओढणे *to draw*, are from the Sans. वोढा from the root वह *to bear, obtain*, &c. वद्दि *to kick, impede*, &c. seems peculiar to the South. Also ओरगु *to fall, to die*. Again, C. ओरते and M.ओढा *a stream*, are from वह *to flow*.

No.	CANARESE.	TA'MIL.	MALAYA'LIM.	TELINGA.
73	ओड Oda A boat Navicula	ओडम् Odam A boat, a ferry-boat Cymba, ponto	ओटम् Otam A boat, a wherry Cymba, scapha	....
74	ओडंवडु Odamvadu To convenant Pactionem facere	ओट्ट Ottu Conjunction ; a vow Unio ; votum	ओट्टम् Ottm A bet, a wager Pignus, spontio	ओड्डु Oddu To bet or wager Pignus opponere
75	ओर Ora Edge, margin Margo	ओरम् Oram Hem, margin Fimbria, margo	ओरं Oram Side, edge Latus, margo	ओर Ora Side, edge Latus, margo
76	ओरटु Oraṭu Coarse (as cloth) Crassus	....	कोटि Koṭi Unbleached (cloth) Non dealbatus	कोरा Kora Unbleached Non insolatus
77	ओरलु Oralu [ed To become acquaint- Usum intercedere	ओरुमै Orumai Singleness, concord Unitas, concordia	ओरुम Oruma Unity, fellowship Unitas, familiaritas	ओरिमिक Orimika Friendship, union Amicitia, conjunctio
78	ओरे Ore To rub Fricare	ओर्गम् Orhgam Restraint ; poverty Continentia; paupertas	....	ओरॅयक, ओरयु Orheyak, orayu Rubbing, to rub Fricatio, fricare
79	ओल ; ओलि Ola ; oli Unwilling ; a pledge Nolens ; pignus	ओत्ति A pawn Pignus	ओल्ल Olla —Must not Nequaquam	ओल्लयि ; ओलि Olayi ; óli Not consenting ; a dowry Nolens ; dos
80	ओल्लि Olli Good ; well Bonus ; bene	ओळ ; ओळि Oḷ ; oḷi Good ; light Bonus ; lux	ओळि Oḷi Light, splendour Lux	बला, भला Balá, bhalá Bravo Euge
81	ओलेकार Olekára An armed peon Miles pedisequus	ओऴुङ्गु Ozhunggu Orderly disposition Dispositio	ओरुक्कम् Orukkam Preparation, readiness Adaptatio	ओलयु Olayu To be proper Aptum esse
82	ओसर O'saru [out A fountain, to ooze Fons, rimis effluere	ओत्ति Otti Aside Seorsum	ओलि ; ओलिव Oli ; oliva A pond ; flowing Lacus ; fluens	ओसरिंचु Osarinchu To move aside Seipsum subducere

No. 74.—Gives us an instance of the prefixing the guttural ङ् in the Northern tongues.

No. 75.—Furnishes us with a striking instance of the prefixing of the guttural क् in the Northern tongues, of which we have seen some previous instances. See also the next number.

SINGHALESE.	MARA'THI'.	GUJERA'THI'.	HINDI'.
ඔරුව	ढोडो	ढोडी	ढोला
Oruva	Hoḍi	Hodi	Hola
A boat, a canoe	A boat, a canoe	A boat	A flat bottomed boat
Cymba, scapha	Navicula, linter	Navicula	Navicula
ඔණ්ටුව	ढोड	ढोड	ढोड
Onttuvá	Hoḍ	Hoḍ	Hoḍ
A wager	A wager, a bet	A wager	A wager
Pignus	Pignus, sponsio	Sponsio	Pignus
අය්ලේ	कोर	कोर	कोर, ओर
Æle	Kor	Kor	Kor, or
The side of the body	Edge, verge	Edge, border	Edge, side
Corporis latus	Margo, ora	Margo, limes	Margo, latus
කොරදුස් ; කොරස්	कोरा	कोरो	कोरा
Koradus ; korus	Kora	Koro	Kora
Unripe (grain); rough	Unbleached (cloth)	Unbleached	Unbleached, &c.
Immaturum ; scaber	Non dealbatus	Non dealbatus	Non dealbatus
අය්ලෙනවා	ओळख	ओलखाण	ओरी
Ælenava	Oḷakh	Olkhán	Orí
To love, adhere to, &c.	Acquaintance	Acquaintance	A protector, a patron
Amare, adhærere	Familiaris usus	Familiaritas	Patronus
.....	ओरपणे, ओरखडणे	वलोरिओ	.....
.....	Orpaṇe, orkhaḍaṇe	Valorio	.....
.....	To scratch, to lacerate	Laceration, a scratch	.....
.....	Scabere, lacerare	Laceratio	.....
.....	ओल	ओल	ओल
.....	Ol	Ol	Ol
.....	A hostage	A hostage, a bail	A hostage
.....	Obses	Obses, vas	Obses
.....	ओला ; भला	भलो ; भलाई	भला
.....	Ola ; bhala	Bhalo ; bhaláí	Bhalá
.....	Profitable ; good	Good ; goodness, prosperity	Good, well
.....	Lucrosus ; bonus	Bonus ; bonitas, felicitas	Bonus, bene
අය්රලනවා	वलावा	.....	.....
Æralanva	Walává	.....	.....
To escort	An escort, a guard	.....	.....
.....	.....	.....	.....
අය්ලලනවා	ओसाड ; आसरणे	ओसरवुं	ओर; ओसराओसरी
Ælalanavá	Osad ; osarne	Osaravun	Or ; osara osree
To open the sluices	Desolate ; to subside	To subside, to recede	Origin ; by turns
Aquam emittere	Desertus ; subsidere	Subsidere, recedere	Origo ; vicissim

No. 77.—Here the root is no doubt ओर *one*, the र being sometimes changed into ल in the North.

No. 80.—We have here a curious process of transformation into the Hindustani from the Tamil. The ओ easily becomes व, the व becomes next ब, as in the Telinga, and finally भ. In the next number the ओ of the Tamil stops in Maráthi at the first stage of व.

ART. III.—*Second Memoir on the Cave-Temples and Monasteries, and other Ancient Buddhist, Brâhmanical and Jaina Remains of Western India.* By JOHN WILSON, D.D., F.R.S., Honorary President of the Bombay Branch of the Royal Asiatic Society.

Presented September 1852.

SINCE the publication, about two years ago, of the Memoir on these interesting antiquities, various additional discoveries have been made concerning them, which, with a view to facilitating further research, it may now be proper to bring before the notice of the Society. Our narrative of these discoveries shall be of the simplest character; and we shall venture on no inferences connected with them which do not appear to be of an obvious character.

We begin, as on the former occasion, with **Rock-cut Temples, and their Appendages** for the accommodation of priests and monks.

CAVES NEAR KONDATI, IN SALSETTE.

Some time ago, we had an opportunity of visiting the Buddhist excavations about a mile and a half from the village of KONDATI, in Salsette. On that occasion we discovered four additional excavations on the western side of the hill, making, with those found on the eastern side, the number of sixteen. The settlement of monks there must, then, have been considerable. On a former occasion we spoke of it as an offset from the more extensive and well-known establishment at *Kánheri*. But of its comparative antiquity we shall not at present venture to state an opinion. The form of the letters on the Kondatí inscriptions certainly appears as ancient as that of most of the inscriptions at Kánherí. We recognized at once in it the word *Gautama*, a name of Buddha; and when a fac-simile is obtained of it, and it is compared with others found elsewhere, there will be little difficulty felt in its decipherment and translation. The cave inscriptions cannot, to any considerable extent, we are persuaded, be successfully dealt with in an isolated form. For a successful decipherment of them, and the

grouping of the Pálí words, of which they are principally composed, and which are but little known, however closely they approach the Sanskrit, a general collation of them is absolutely necessary. The labours of Lieutenant Brett, employed by Government in taking them all in fac-simile, under the direction of our Cave Commission, when brought to a close, will give our Orientalists the fullest opportunity of doing justice to them.*

On a former occasion we had an opportunity of exhibiting to the Society some drawings of these caves at Kondati, made by a young man in the employment of Mr. Law and Dr. Gibson. There is nothing very remarkable either about their architecture or sculpture, though a group of figures on the left of the entrance to the room containing the *Dhágob*, which is now considerably injured, appears to have been well executed. It is a peculiarity of these excavations, that they are made at the very top of the hill on which they are situated. The superincumbent rock left above them is little more than sufficient to form for them an adequate roof. We have seen no caves in any other part of India corresponding with them in this respect.

CAVES OF ELEPHANTA.

Since the appearance of the Memoir on the Cave-temples, in 1850, a large clearance has been made of the earth, stones, and rubbish accumulated in front of the northern aisle of the ELEPHANTA Caves. This was effected by a subscription of upwards of two thousand rupees by the society of Bombay, raised principally by the zealous exertions of Captain French. It has led to the discovery of two interesting objects of sculpture, a pair of moveable leo-griffs hewn out of a compact porphyritic basalt, remarkably well executed, which guard the staircase, which has now been brought to light. The counterpart of these leo-griffs, made of the same material, and of the same form, we lately observed in the Bráhmanical excavations of the "*Dhumár Lena*" at *Elora*, as

* Since this paper was read to the Society, we have had the pleasure of receiving Professor H. H. Wilson's lecture on "The present state of the cultivation of Oriental Literature." The following extract from it is quite in unison with these remarks:— "Translations of some of them [the cave inscriptions] have been attempted; but it may be doubted if we can yet place much reliance on either the transcripts or the translations. The former evidently require collation before they can be satisfactorily interpreted. The services of a scholar, well acquainted with Sanskrit, and with the modifications of the Nágarí alphabet found in India, are required, who may compare the transcripts with the originals on the spot, and verify or correct them, at the same time that he takes careful copies of such as have not yet been transcribed."

they are popularly called, which some years ago we had noted as remarkably like the caves of Elephanta, both in their general plan and mythological figures and groups of figures. A new link of connexion between the Shaiva temples of Elephanta and Elora has thus been unexpectedly obtained. The reddish basaltic stone of which the lea-griffs are made is not to be found *in situ* in the island of Elephanta. As far as we can judge, it is from the same quarry that has furnished the material for the modern structural temple of *Ahilyá Bái*, of the Hólkar family, at the village of Elora, which, we learn from a valuable communication of Colonel Twemlow, lies a little to the northward of the *Indra Sabhá* at Elora. If this opinion be correct, it must have been brought to Elephanta at considerable expense.

The commonly received theory of the Shaiva character of the great Elephanta Cave has lately received additional illustrations from our learned Vice-President, Dr. Stevenson, who, in his ingenious paper, inserted in the last number of our journal, has given a notice of its mythological figures, more condensed than that which is found in the admirable paper of Mr. Erskine published in our Transactions.

CAVES IN THE KONKAN, AT CHIPALUN, PATAN, &c.

In the Memoir on the Caves we mentioned, under the heading of "Caves in the Konkan unvisited by Europeans," the probable existence of several series of religious excavations, of which we had received native reports, especially from a well-known Bráhman antiquarian, Vishnu Shástrí. One of these series, at CHIPALUN, has been found by Mr. Arthur West, C.E., at present engaged in the Engineer Department under Government. It is about a quarter of a mile south of the town. It consists of a tolerably large room, twenty-two feet long, fifteen broad, and ten high, containing a Buddhist *Dhágob* at its farther end; two or three smaller caves, one of which is now filled up with earth, for the accommodation of monks; and a deep tank for holding water, thirteen feet square, on the surface. With a ground plan of these caves we have been furnished by Mr. West.

Four miles north of PATAN, near the road leading from *Chipalun* to *Karhád*, Mr. West has discovered another small series of Buddhist caves. They consist of a room with a small round *Dhágob*, six feet in diameter, and of a *Sháláa*, or hall, nineteen feet by eighteen, with an elevated seat at one of its corners, and three recesses or closets at its inner extremity, of which the middle one is the smallest.

Two small caves we lately noticed for the first time in a *khind*, or pass, between REVADANDA and AMBEPUR. They have at present no

distinctive character; but they were probably originally places of repose for Buddhist travellers passing from the ghâts to the coast.

We have received pretty distinct intelligence of the existence of some important series of caves in the mountainous territory lately belonging to the *Pant Sachiva*, which has been very little explored, or even visited, by Europeans.

CAVES NEAR AURANGABAD AND ELORA.

Connected with the neighbourhood of AURANGABAD and ELORA, Colonel Twemlow, whose antiquarian zeal and conciliatory dealings with the natives in all his inquiries are so well known, has, through the Bombay Government, brought to the notice of our Society several excavations which have been hitherto overlooked. The following is a quotation from the Colonel's communication:—

"On an ancient fort, three miles SE. of *Daulatábád*, now in ruins, but which must formerly have equalled, if not excelled Daulatábád in strength and extent, are numerous cave-cisterns, some having pillars, aptly elucidating the original object of the excavations to have been *accumulating of water in high places*. These cisterns of water, like those of Daulatábád, might have the front retaining wall cut down; and the excavations could then be formed into caves and dwellings.

"The hill is called '*Chaman Tenkadi*,' or by some '*Chamar Tukadá*.' It was visited lately by Dr. Bradley and myself, and the dimensions of the caves were taken by Dr. Bradley, who will, no doubt, describe these ancient excavations.

"The fortress had a tunnel entrance, but it has either fallen in, or been purposely destroyed. There was an upper and a lower fort; the upper fort had a space of level interior about 300 yards by 50.

"There is a similar ancient fort, named (by the moderns) *Rohillá-ghad*, about twenty miles east of Aurangábád, containing water-cisterns and caves. They have been filled up, however, by the Natives of the adjoining villages, as they gave refuge to tigers, and other beasts of prey, which descended on any cattle straying near their lairs. This hill or fort was ascended by me, in course of the search made (in the month of May 1849) for Rohillá plunderers, and has since been visited by Dr. Bradley, with a view to descriptions being given of the caves and cisterns.

"In addition to the '*Caves of Aurangábád*,' described as the northern series, there are several other caves facing the east and north, in the range of scarped trap hills, which probably formed the southern,

and part of the eastern outer fortifications of the ancient city of '*Bhadravat.*' They have been visited by Dr. Bradley.

" In a hill near the village of *Sitárá*, three miles south-east of the cantonment of Aurangábád, there are two rude excavations, the commencement of caves.

" On the western face of the hill immediately north of the Caves of Elora, called '*Mhaismalá*,' there are some small caves. This hill is much visited by the native Waidyas, or doctors, for medicinal herbs, and has on it mounds of stones, as if ruins of ancient buildings.

" There is at least one cave on the western scarp of the hill immediately south of *Rauzah*, in the hill called the "*Cavalry Rama*": it has no sculptures in it, and used formerly to be a hiding place of the Bhíls."

Of the more important excavations now mentioned by Colonel Twemlow, an extended and interesting account by Dr. W. H. Bradley has been forwarded to the Cave Commission, by Captain Cuthbert Davidson, Assistant Resident at Haidarábád, at the request of the Resident at the Court of his Highness the Nizám, Major General Fraser. Though this document has been already published in the Madras *Journal of Science and Literature*, and communicated to the Royal Asiatic Society, an analysis of it, with copious extracts, may be here introduced, to complete our general notices of the Cave-temples of Western India, as far as they have yet been brought to light:—

" In the hill north of Aurangábád, and within half an hour's walk of its walls," says Dr. Bradley, " are seen some ruined Buddhist and Jaina cave-temples, half concealed amongst fallen rocks and earth. Much of the sculpture still remains in tolerable preservation, and gives a pleasing idea of what the state of the arts was in this country, where now nothing of the sort exists. The temples have been wrought in the same table-land that contains the Caves of Elora." The hills in which they are found are "of amygdaloidal trap, of varying degrees of induration, and rising at their highest points to about 700 feet above the plains." A whitened mark, about two-thirds up the ascent, indicates the level at which the first and principal series of them is to be found. This mark is at a small Jaina cave, now devoted to the Tirthankar *Neminátth* by the present Jainas of Aurangábád. The other excavations, however, are all manifestly of a Buddhist character.

Dr. Bradley divides these caves into three groups, which are scattered over a space about a mile and a half in extent. His description of them commences with those of them which are farthest to the west.

First Group.—After alluding to three caves now filled with earth and rubbish, Dr. B. gives a particular account of those which are accessible.* Of these—

1. The *first* "is a small cave, consisting of an anterior vestibule and sanctuary, with a passage round it. The entrance into it is rendered somewhat difficult by fallen rock and bushes." "In the half-choked ante-room, Buddhist figures are seen ranged right and left on the walls in compartments, the seated figures of Buddha having the legs either dependent or crossed, with the hands invariably placed in an attitude of devotion. The vestibule fronting the sanctuary has the roof supported by two square pillars and two pilasters, well sculptured. The sanctuary is fourteen feet square and ten feet high, with the door towards the south: a passage, three feet broad, passes the whole way round. In front of the door is seated the image of Buddha, nine feet high as sitting. The legs rest on the expanded calyx of the lotus, and the hands are disposed in the usual attitude of contemplation—represented here by the thumb of the right hand pressing the little finger of the left. A thin drapery seems to cover a portion of the idol, the folds of which become apparent round the neck, lap, waist, and across the thighs, the ends being gathered and grasped in the left hand. Neither beard nor mustachios are visible. The hair of the head is arranged in small conical curls, terminating in a round knot or bunch on the summit. The ears hang low, with stretched lobes, pierced in the same manner as seen in the *Jogis* of the present day. No ornament appears upon the figure, unless a small hemispherical protuberance upon the forehead, about the size of a marble, deserves the name. The *Sinhásan*, or lion-throne, on which the figure is seated, has maned lions right and left, supporting the bench. Behind are represented several animals. At the base is an elephant crouching, with his trunk curled up beneath his head. Immediately above him rests a four-legged animal in a rearing attitude, carrying a human being on his back. He has a neck scaly like a dragon, a goat-like head, with protruding eyes, and four short horns, two curving backwards and two upright. His tail and claws are like a lion's. This fabulous animal is constantly represented in old Hindu temples, and at Elora is seen as one of the nondescript animals supporting Mahádeva's grand hall in *Kailás*." "At the top of all, and on a level with the upper part of the throne, appear the head and shoulders of some open-mouthed probiscidean monster." "Winged praying figures kneel on either side of the head of the idol, behind which appears a nimbus. Over the image in each corner are seated figures of Buddha in high relief; and the walls right and

left have similar figures placed one above the other, in four rows, some having the legs crossed, others hanging down. Each figure has subordinate attendants. The doorway is simple. Sockets are let into the jambs for the doors, which turned on pivots, and were bivalved, fastening by a bar across. A plain pillar-moulding forms the door-frame outside, with a simple lintel, surmounted by ornamental carved work of pagodas, having roofs approaching a bell shape. Each pagoda contains three niches, the centre one holding Buddha seated, and the two on either side standing figures of *Bodhisatvas*. On each side of the door stand gigantic *dwárpáls*, or doorkeepers, nine feet high, each accompanied by a figure canopied under five heads of the hooded snake. The colossal figures are generally present in Buddhist caves, either as *dwárpáls*, or within the sanctuary as attendants upon the idol, and invariably represented as most opposite to each other in costume. It is not so with the equally colossal *chauriwálás* (fly-flappers), that generally accompany them in the sanctuary, who are always habited alike. The doorkeeper on the right is richly ornamented: he wears a high pointed jewelled cap, the most prominent decoration upon it being a seated figure of Buddha, carved on a round ornament in front; the throat and neck are encircled by collars and necklaces; and the arms and wrists are adorned by armlets and bracelets richly cut. In the ears, which are long lobed and split, are placed earrings, the right of which is globular, and studded with elaborate representations of jewellery, whilst the left is a disc of some two three inches in diameter." "A narrow fillet confines the waist above the navel, falling down in front, in waving cords. Around the loins three or four folds of a chain, arranged in square links, are passed, whilst the *shelá*, or robe, crosses over the upper part of the thigh from right to left, and is held in the left hand. The right supports a long stalk of the lotus, on the calyx of which rests a small cross-legged figure of Buddha. The attendant figure with the snake canopy wears a diadem, jewelled necklace, and armlets. Both hands grasp the lower portion of the lotus. Over the *dwárpál* appears a flying figure, bearing a necklace of flowers. The doorkeeper on the left side has much the character of the Hindu penitential ascetics of the present day. He is represented devoid of all ornaments: in lieu of the jewelled cap, he wears his own hair twisted turban-fashion round his head, elfin locks falling over either shoulder. Upon his left shoulder hangs the skin of an antelope. Below the navel, a band passes round the body, from which hangs a narrow fold of drapery. The right hand holds a rosary, while the left supports a slender waving lotus stalk, on which a seated figure of Buddha rests. The snake-canopied

attendant and flying figure are counterparts of those on the opposite side. The walls of the vestibule and passage passing round the sanctuary are covered with compartments, holding high reliefs of Buddha seated on a lotus, the stem of which is grasped by two figures wearing wigs and tiaras, canopied by snakes. Two smaller stems, springing from the principal stalk, support attendants on their flowers, who appear to be repetitions '*en pettit*' of the *dwárpáls* of the sanctuary. Buddha sometimes is represented with the legs crossed, as well as dependent: the hands as seen in the sanctuary, with one exception, where the back of the right hand rests upon the left palm."

2. The *second* is a *Vihára* cave, of fifty feet square, exclusive of side cells and sanctuary, to a great extent filled with sandy mud. "The wall of the outer veranda is pierced by three doorways, leading into the hall, which is twelve feet high, and the roof is supported by twelve pillars and four pilasters. These have rectangular plinths, with shafts rising in a rectangular manner for about a fourth their height, and then breaking into polygonal shapes, fluted or plain, encircled with richly decorated bands and fillets of rosettes and beading, surmounted by a capacious capital, either cushion-shaped, or that peculiar form known as the vase and falling leaf, where the capital is vase-like, with elegantly carved leaves, drooping in spiral volutes from the points of the abacus. The architrave resting on the pillars is enriched with sculpture, generally representing Buddha seated with females, surrounded by a profusion of gracefully arranged and well-sculptured foliage. Medallions, ornamented with lions, elephants, and nondescript animals, serve to support the whole entablature. A medallion in demi-relievo occupies the centre of the shafts in the side pilasters, of Buddha and females, with very beautifully designed fillets and bands in bead-work surrounding it. The same medallions are frequently repeated upon the pillars generally throughout. In several instances statuettes of females standing, or fat males seated, with chancellors' wigs, are placed at the corners of the square pillars; and as these pillars are arranged in pairs, no two of which resemble each other, great variety of design is seen. The frieze resting on the architrave fronting the entrance is covered by a series of sculptured figures in demi-relief, divided into thirteen compartments, evidently referring to Buddhist subjects. The sculpture is nine inches high, and clearly and cleverly executed. The first compartment represents a naked male figure seated on a throne, with a child upon his knee. He wears an ornamented high pointed cap, and jewelled necklace. An aged female, seated on the ground in front, is holding towards him another child, whilst behind, two naked male

figures are sitting, who, by the high caps, and wheel earrings they wear, appear to be *jogís*. One of them holds forth his hand, as though he were exhorting. Behind the principal seated figures are wigged attendants, a female *chauriwálá* on his right, and a male on his left, both furnished with the least possible quantity of clothing. Another attendant carries something like a book or box. The second compartment represents a bear, wearing a jewelled collar, riding on the back of a tiger. A male and female appear, offering presents in front. Musicians, in niches above, are playing various instruments, one of whom is using the plectrum, instead of striking with the fingers. The third group represents the same principal figure seated on a throne, with a female, in a state of nudity, standing by his side, two male wigged figures being in attendance. The fourth group is a subject not easily reconciled with the mild tenets of Buddhism, which inculcated respect to life. The impalement of a man is here represented: the executioner is employed binding the victim to the stake, which has been thrust through the body, passing out at the left side of the neck; a dog stands near the stake, and a little beyond is a female. A forest is supposed to be represented, by the variety of foliage occupying the back-ground. The fifth compartment shows an obese old man, seated, listening to a female on her knees, playing some instrument. He wears a large wig. Over-head appears suspended a range of bells. The sixth compartment contains a naked male, with a female figure, seated on a throne, his left hand holding hers. Various wigged figures are dispersed about, one carrying a vessel, into which he dips his hand. Another in front rests in a half kneeling and sitting attitude. This appears to represent circumstances attending the celebration of marriage, judging by the joined hands, and the attendant with the vessel for the libation of water, which is to be poured over the hands thus united, and may have reference to Buddha's marriage with *Yáshodharáa Devi*. The next compartment shows an old man in a flowing wig, mounted on the back of a person, who bends under the load he carries: an attendant in the rear appears lending aid. Four other figures are in the back-ground, two with flowing wigs, and two wearing bob-wigs. The eighth group is a battle piece, in which bows and arrows, swords, and oblong shields are used. The battle is continued on into the next compartment, where a colossal figure is thrown down, to whom a wigged figure appears addressing himself. Two men with snake-hoods, and two naked females, fill up the space beyond. The ninth group shows Buddha reclining on a bench within a forest, entering into *Nirvána* [ultimate repose]: a pig is represented on the left of the bench, and a tiger on the right; the

heads of both being directed towards the prostrate figure. A man mounted on a horse appears in the left corner. The horse is in action, and wears a plumed crest between the ears. At the opposite corner a holy ascetic is seen seated under a palm-tree, with a tiger on his right. Above him, in compartments, are half figures of snake-hooded, and wigged attendants, both male and female. Two horses' heads are observable amongst the foliage of the back-ground. The tenth group appears divided into three portions. In the right corner is an old man in an ample wig, seated on the shoulders of another man. The centre represents the entrance of a natural cave, overshadowed by trees, into which the two figures just noticed appear entering, and the left corner is occupied by an assemblage of figures in all sorts of wigs, large and small, the principal figure being the old man, who appears in the act of teaching. A figure with a *jogi's* cap, and wheel earrings, is seated at his feet; a canopy of foliage extends over-head. The eleventh compartment represents a procession of figures mounted on horses and elephants, preceded by two men, the one blowing the *shinghárá*, the other beating the *dhol*. The horsemen carry straight swords by their sides, and wear wigs. A crested plume adorns each horse's head, and an umbrella of state is carried over the rider's head. One elephant is in motion, whilst the other is lying down, and thrusting out his hind leg for the convenience of the rider to mount, who is in the act of stepping on the elephant's foot for that purpose. An umbrella is also held over this person. The last compartment represents the same principal male and female figures seated on a couch, with drapery. They appear to be listening to the sounds of the *viná*, played by a male wigged figure on the right; and a naked female on the left is apparently accompanying it with her voice, judging by the attitude she adopts. Round the frieze within the hall, a series of sculptured pagodas in high relief are arranged, the alternate ones slightly projecting. Those most prominent contain a male and female figure in amatory dalliance, with females in separate niches, right and left, as attendants: in the niches of the receding pagodas, there are placed a squab fat wigged man, with attendant females. Towards the north and south are recesses in the wall, the roofs being supported by two pillars and two pilasters, whose designs differ very much from those before described. The pillars in the western recess are more exuberant in their decorations than the eastern ones. Cells occupy each corner of the hall, whose dimensions are fifteen feet long, by ten broad. The vestibule to the sanctuary is supported by two pillars and two pilasters, of the same form as seen in the recess, but infinitely more

rich in their decorations. A richly cut moulding skirts the sides and tops of the entrance, arranged in what heraldry terms imbattled lines. The ornamental border represents chain and bead-work, with rosettes; and in each compartment formed of this arrangement of the design, appear figures of amatory couples. Round the cornice above are seen flying figures, bearing necklaces of flowers and heads of the horned fabulous monster. The pillars and pilasters are of the most exuberant style of decoration, and covered with sculpture from the base to the summit of the capital, the shafts breaking from squares into eight, sixteen, and thirty-two sides, braced round with broad bands, on which amatory figures are shown in demi-relievo, or narrow fillets of bead-work, bells, rosettes, drapery, lozenges, and leaves. A richer effect is produced by the capital being divided into thirty-two sides. The sanctuary contains a seated colossal figure of Buddha, on whose form the light falls, leaving all around in gloom, which incident is not without its mysterious influence. His position is similar to that of the idol in the cave just described, and his lion-throne presents the same decorative sculpture. Gigantic *chauriwálás* stand on either side, with flying figures above. In front, ranged along the sides, right and left, are groups of kneeling figures, male and female. They nearly all wear tiaras and richly ornamented jewelled dresses, the arrangement of the hair being of the most elaborate description: the countenances, with one or two exceptions, betray a Mongolo-Tartar origin, from the breadth of the cheek bones, projecting shape of the lower jaw, and thick lips."

3. A few paces eastward brings us to the ruins of number *three*, a *chaitya* cave. Large portions of the face of the rock have here fallen, carrying with it the whole front, and a great portion of the cave itself. The dimensions are very insignificant in comparison with those of a similar description at Karlá and Elorá. No sculpture nor ornaments appear upon the circular basement. Upon the pillars, and aisles, remains of painted stucco may be observed.

4. The *fourth* cave, the last of this group, is of small dimensions, being only about twelve feet long, by nine broad. It is the one which is conspicuous at a distance, by its having been white-washed. It contains the Jaina image of *Neminátth*, the twenty-second *Tirthankar*.

SECOND SERIES.—This is situated about a mile to the east of that now noticed, and in the same hill-side. It consists of four caves, two of which are much hidden by bushes.

5. The *fifth* excavation, the first of this series, has a ruined external

veranda, inner veranda, vestibule, sanctuary, with passage passing round, and lateral cells, leading off right and left, at either extremity. "The doorway of the sanctuary has two broad steps in front, guarded by doorkeepers, bearing the snake-hooded canopy. Gigantic figures, ten feet high, wearing the high conical cap with the Buddhist emblem, stand at either extremity. On each side of them are a male and female figure, carrying cornucopiæ, and wreaths, hovering over their heads." "The figure of Buddha is the same as those already referred to. His attendants are two tall figures seven feet high, standing on each side of the throne. Two rows of kneeling figures, three feet high, are ranged on either side, five in a row, the females being upon the left, and the males upon the right. The passage running round the sanctuary has lateral cells, whilst two chapels, containing seated figures of Buddha, are excavated in the northern wall facing the side passages."

6. A few yards further east is number *six*, with an outer veranda, a hall or inner veranda, with recesses and sanctuary, and a passage surrounding it, pierced by cells. The outer veranda, as in the last cave, has nearly disappeared. "The inner veranda or hall has the entrance supported by four handsome pillars and two pilasters. The shafts are rectangular, with sculptured scrolled medallions, containing the frequently repeated group of amatory figures. The upper part of the shaft is encircled by a band, on which elephants are cut. Passing down into the hall, or inner veranda, by one step, the doorway leading to the sanctuary is seen immediately in front. It is very richly sculptured." "The two windows to the side passages are as elaborately finished as the doorway." "Between the door and windows we find sculptured on the wall, in very high relief, gigantic figures of two remarkable Buddhist attendants." "There is some remarkable sculpture associated with one of these figures. It is arranged in eight groups on projecting ledges, four on either side of the figure: the parties forming each group seem in the attitude of prayer or supplication. All are looking towards the idol, at the extremity of each ledge. A flying figure, with Buddhist emblems, is interposed, as if forming the communication between the idol and the suppliants. The first group upon the right, commencing from above, is much mutilated. It represents a portion of two figures, kneeling with closed hands. Behind them appears a mass of flaming fire. The second ledge contains three male figures wearing wigs: the outside one holds a sword in his right hand, and a standard in his left; the centre one carries an umbrella over the other, who is kneeling. The third group represents three figures, bound hands and feet. The fourth shows a ship in full sail, with main-mast and mizen-mast, back

stays, streamers, and mat sails ; a person is steering the vessel with an oar over the counter. Another stands amidships, holding a round vessel in his hands, as does another person in the bows, who, by the necklace and head-dress, appears to be a female. Commencing at the top, on the left side, we have two figures kneeling—a male, with hands joined in prayer, and a female, clasping him round the neck and waist. A maned lion sits behind, holding up one paw. The second group has a male and female praying. Behind them are *Lingas (?)* out of which the heads of the cobra are protruding. The third group is a kneeling figure, beside which stands a Buddhist ascetic praying. An elephant, beneath a mango tree, is behind. The last group is much mutilated, but appears to be a female, seated, bearing an infant in her arms. An old hag with pendant breasts and streaming hair stands over her; serpents are twined round her neck and arm. A Buddhist ascetic is praying behind them. The stucco painting shows an old beldam painted white, in the attitude of dancing. Her left hand holds a snake, which passes round her throat in lieu of a necklace. Her right hand, upraised, points with a forefinger towards a figure beside her. She wears bands of blue beads round her wrists and ankles; her hair hangs in elfin locks over her flaccid breasts. A portion only of a black figure is seen kneeling before her. The richly dressed figure occupies as conspicuous a position as the one just described. He wears a conical ornamented cap, with the Buddhist emblem in front. In the right ear is worn an earring of a wheel-shaped form, whilst in the left he wears a ring-shaped necklace, bar armlets, bracelets, and waist ornaments, as before described in the first cave. On each side are placed male and female figures five feet high, who are, again, attended by dwarfs. The western recess contains a series of figures ranged against the wall, cut in such bold relief as to approach very nearly the appearance of statues. They are eight in number, the first and last representing the two classes of Buddhist religionists ; the intermediate ones are all females. The northern figure is a *Bodhisatva*, holding his robe in his left hand, in the attitude these figures generally are seen adopting. The southern figure is apparently a sacred mendicant. The six females all bear flowers and fruit in their hands, and each have the hair very elaborately arranged. Females were permitted by *Sakya Muni* (Buddha) to embrace a religious life, and this cave may probably have been a convent for nuns. In the opposite recess, two figures are seen seated on cushioned seats with backs. One is a ventricose old man, with a full-bosomed female seated by his side, nursing a child upon her knee. They have attendants behind, and

flying figures above. Standing on brackets at the corners to the north are two well-sculptured females, the size of life. The gallery passing round the sanctuary is ascended by three steps. The sanctuary itself is raised above these two steps again. From the galleries six cells open; and at the further extremity of the galleries are two chapels, containing seated figures of Buddha. The sanctuary is a small chamber, ten feet square, containing the usual seated figure of Buddha, with a lion-throne more than usually ornamented. Out of the mouth of the probiscidean monster is seen rising the gracefully curved neck of the ibis; snake-hooded figures kneel on the back of the throne; and figures bestriding the horned monster, attacking others resting on the kneeling elephant's head beneath, are executed in the best possible taste. Flying figures in pairs are perched above, whilst Buddhist figures, arranged one above the other in three rows, are placed on either side." "The wall on the right of the idol is occupied by a group of females in demi-relievo, standing three and a half feet high. The central figure is a dancing girl, very slightly attired; the rest are playing a variety of instruments, each adorned with an elaborate head-dress." "The opposite wall has some cleverly sculptured figures of the same size." "The doorway is very richly ornamented in the mouldings of the frame-work, and guarded by snake-hooded *dwárpáls*. Right and left of the entrance to the sanctum are ranged along the walls large female figures with attendants. On the right of the door the sculptures are a female very profusely covered with jewelled attire, and ornamented head-dress, her bosom extravagantly proportioned, and holding the stalk of the lotus. Two female attendants, in scanty habiliments, smaller in height, are on either side of her, bearing fruit and flowers; and beyond them stand dwarfs—one, leaning on a crooked stick, seems to bend beneath the weight of the female's hand, resting on his head; above are flying figures. The cornice of the wall is formed of the convex caves of a temple, in which seated Buddhist figures are represented. The wall on the left of the sanctum door is covered in like manner with a buxom lady, and attendants, similarly attired; but in this cave no praying figures appear above, as on the opposite side, by which we may infer some association between these two females, and the simple and decorated attendants without. The appearance of dwarfs is a common circumstance in eastern mythology, and has a mystical allusion no doubt."

7. "The front of the next *(or seventh)* cave having fallen, no access to it can be accomplished, but by help of a ladder. It measures 27 feet in breadth, by 20 in length, and is an unfinished *Vihára*,

without pillars or sanctuary. There are six cells opening into it, with a window. An opening in the wall towards the east leads to another half-dug cave in the same unfinished condition, supplied with a verandah, which is supported by two pillars and two pilasters. A large portion of the frontage has fallen. This second cave is 20 feet long."

8. "Ascending the hill, some few yards easterly, the *eighth* group of caves is seen, which are not observed until close upon them. The whole length of excavation is upwards of a hundred feet, extending to a depth of sixty." "The arrangement appears to have been an outer verandah, that has slid down the side of the mountain, nothing but a very small portion remaining. The hall extended the whole length of the excavation, from which four caves opened." "The centre one is the largest, having an inner verandah, vestibule, and sanctum." "As you scramble over rocks and bushes into the cave, you have to step across a misshapen mass of rock lying in your path, which, after looking at a second time, you perceive to be the time-worn sculpture of a recumbent figure of Buddha, fifteen feet in length." "Passing onward into the most westerly of the three northern caves, we note the capitals of pillars adhering to the roof, occupied by Buddhist figures in penitential attitudes. The sanctum contains a seated Buddhist idol." "Doorkeepers, seven feet high, stand at the entrance." "A doorway is broken through the wall of the vestibule into the adjoining cave, which is the largest. The vestibule here, as in the last cave, has no more remaining of its two pillars and two pilasters that supported the roof. At each corner of this verandah are placed well-sculptured figures of females in very high relief. This cave is buried in rubbish up to the knees of the figures, from whence to the top of their head-dresses they measure seven feet; each figure is most exquisitely sculptured, that is, the ornaments are with which they are covered, for nothing can be more skilfully or cleverly carved than the jewelled gear and flowers that adorn their head-dresses, or the sharp chiselling and symmetry of chains and links and jewelled ornaments about their persons." "The door of the vestibule has *dwárpáls* of the same colossal proportions, bearing Buddhist emblems in their head-dresses. Flying figures appear above. Within are seated two obese old men, wearing bar armlets; and the door of the sanctum is guarded by *dwárpáls* six feet high, bearing the five-hooded snake canopy; the left one only is finished. The sanctum is in an unfinished condition." "The other northern excavation is of small dimensions. The pillars of the vestibule show the same ruined state as the two others." "In niches of the verandah are figures of Buddha; in the hall, female figures

similar to those remarked in the last cave are seen ; the floor is greatly encumbered with fallen ruins. The sanctuary contains a seated figure of Buddha in a meditative position. The side cave opening to the east is choked up with mud and rubbish, leaving nothing visible but the capitals of the pillars."

THIRD SERIES.—"About a mile to the eastward, in the curve of the same range, two or three caves have been commenced, not one of which was ever finished. The sight has more claims to the picturesque than those we have just noticed, commanding a pleasing prospect towards the adjoining hills."

9. "Number *nine* is the commencement of a cave, the front of which is nearly buried, and measures 18 feet in length, and 9 feet in breadth.

10. "Number *ten* is a cave with outer verandah and hall, 28 feet in length, broken off abruptly after excavating to 13 feet.

11. "Number *eleven* is a cave of large dimensions, consisting of out verandah, hall, vestibule, sanctuary, and side crypts. The breadth of the hall is 46 feet, with lateral cells extending to seven feet on either side. The depth of the rock from the outer verandah to the further wall of the sanctum is 80 feet: all is left in the rough, as if abruptly broken off, and nothing approaching to a finished state but the front of the verandah. Though I have termed the excavations on either side of the hall lateral cells, from the resemblance they now bear to such a use, I am inclined to suppose these side cuttings to have been nothing more than the preliminary steps for forming the side pillars and aisles, which were intended to have surrounded the central hall."

The most important of these caves, now mentioned in detail by Dr. Bradley, we had an opportunity of personally inspecting under the able direction of Colonel Twemlow, in January 1852. Their sculpture, all things considered, is, for India, of a superior character, and was probably executed by native workmen, acting under the direction of Greek or Bactrian artists, whose connexion with others of our caves we shall afterwards have an opportunity of noticing. It appears to us very desirable that the most important of them should be entirely cleared of the earth and rubbish by which they are nearly filled; and a recommendation to this effect will be made by the Cave Commission to Government. Almost all the larger groups of caves in the Mahárashtra have their peculiarities calculated to attract attention; as, for instance, those at Aurangábád are remarkable for their sculpture, those at Elora for their extent and variety, those at Ajantá for their painted scenes, and those at Elephanta for their unique image of the Hindu Triad. It

is wonderful that the Aurangábád caves, most of which are so accessible, should have been hitherto so little regarded.

On a late incidental visit to the Caves of ELORA, we had the benefit of reviewing them under the able direction of Colonel Twemlow, who is so familiar with themfrom his residence in their neighbourhood, and his eagerness in antiquarian research. He is of opinion that the Bráhmanical excavations and monolithic temples are merely Buddhist works, accommodated by additional sculpture of an extended kind to the views and conveniences of the followers of Shiva. For this opinion the arguments are two: large portions of the architecture, as it even now meets the eye, strongly resemble that of the Buddhists in its neighbourhood; and the centre of the hilly amphitheatre in which the excavations occur would probably be that first occupied by the Buddhists, the original possessors of the locality. In regard to a few of the excavations, it may be correct. The others throughout are so thoroughly characteristic of Bráhmanism, in their general plan as well as in their individual details, that we consider them the product of that system of faith, not, however, without a manifest imitation, in some respects, of Buddhist, or its auxiliary Grecian art.

We have lately come to the conclusion that the Buddhist southern excavations, which now bear the name of *Dherwádá*, were originally denominated *Therawádá*, or residence of the *Therás*, or monks. The *Dhers*, or *Dheds*, as is well known, are a low and degraded tribe of aborigines in Gujarát, and their name was probably given by the Bráhmans to the Buddhist monasteries in contempt.

It is now pretty well known that several of those monsters of iniquity, the *Thags*, when brought to trial in different parts of India, have urged that their horrid profession has a divine sanction in the cave-temples of Elora. When lately there, we observed a group of figures which may have given rise to this idea. It does not, however, support the interpretation which the Thags would wish to put upon it. It merely represents a devotee of Shiva taking refuge with his lord from a Thag about to strangle him in the usual manner of the craft. It proves the existence of the Thags at the time of the first-formed Bráhmanical excavations.

To the probable date of the origin of the respective caves of Elora and other places—Buddhist, Bráhmanical, and Jaina—we shall onwards allude. Some additional helps to a judgment in this matter, of great historical interest, we lately procured at Elora and other localities. We have found none of them in the Sanskrit legend of Elora, which, through the

help of Colonel Twemlow, we procured from the Bráhmans of the modern village of that name.

CAVES IN THE INDHYADRI RANGE.

In our first Memoir on the antiquities of Western India, we expressed our belief, with regard to the excavations at Ajantá, that "it is extremely probable that other groups of caves remain to be discovered in their neighbourhood, which, from representations made to the writer of these notes when visiting it, appears to have been but little explored by Europeans." Shortly after the Memoir appeared, a remark of Captain French at one of our meetings led to inquiries by Capt. James Rose about a cave in Khándesh, which had been seen by Captain French. This cave proved to be of an insignificant character; but the search for it led to the discovery by Captain Rose of an important Buddhist establishment in the INDHYADRI range in which Ajantá is situated, and not many miles distant from the small station of Kanhar. The following is the original account of his visit to it by Captain Rose, a portion of which, but with a good many important typographical errors, has already appeared in the Society's Journal. We add to it a few notes and observations :—

"On Saturday the 24th [of August 1851] I set out with the intention of visiting the cave with the door near the foot of *Kanerá* fort, which I had never been nearer than the road which passes through the valley below it through the deserted town of PATNA, where an annual *yátrá* assembles. In my inquiries about this cave, and on my way to it, I learnt that it is a very insignificant excavation, which would pass unnoticed but for the conspicuous little door, which doubtless caught your eye as it did mine, but that in a gorge of the hills near it there were real caves, like those near Ajantá.

"As these were to the east of the *Ganesh Ghát*, and consequently nearer *Kanhar* than the cave for which my trip was chiefly intended, and as the sky looked threatening, I determined upon going to them first.

"The road is very difficult, but when the *Pipal-khorá* (the name of the ravine in which the caves are concealed) is gained, the scene of grandeur passes any description I can give. It is awfully and fearfully grand and beautiful.

"When within less than eighty yards of the caves, it was almost impossible to believe the guide that the excavations he described were so near, although he pointed to the exact spot. The ravine is much grander, and the approach to the caves more difficult, than at Ajantá, and there were evident marks of their being frequented by wild beasts;

but although I was quite prepared for all comers, not even a bear showed itself.

" I have spoken of the *caves;* but only one excavation deserving the name is remaining. This exactly resembles some of those at Ajantá. " The arched roof and pillars, covered with paintings of human figures, etc. are just the same. The figures are very distinct in many instances, and women and men seem to be mixed. There is nothing about them unchaste, and in general they have circles, or what are sometimes called ' glories,' round their heads, similar to those given in the fancied representations of our Saviour.

" One drawing struck me particularly, in which a female is represented with long ringlets, just as ladies sometimes dress their hair in our own times. This figure was quite fair, and yet close to it was a very dark female likeness, of the *Habshí* caste of feature, with very black curly hair.

" The stone here was much more brittle than at Ajantá or Elora ; and consequently some of the pillars are broken, and the excavators failed in their attempt to represent arched rafters, as they succeeded in doing at Ajantá, for the same reason.

" The other three caves here are, in fact, nearly blocked up, from the rock falling down from above. One of them, however, on descending into it over the fragments of rock, is in tolerable preservation, though none of them appear to have been quite completed, as is also the case at Rozah and Ajantá. Where the rock had given way before the chisel, the masons had neatly substituted stone, and this is the case at Rozah, as I observed, or rather Colonel Twemlow did.

" In the painted cave, the paintings are done over a coating of chunam.

" The only sculptures are two or three representations of elephants, tigers, bullocks, and deer, or goats, cut out in small dimensions, back to back, like our lion and unicorn.

" There may have been sculptures and inscriptions ; but if there ever were, they have disappeared into the ravine below, as the rock is constantly giving way.

" These caves the guide (an old man) said were never visited by a Sáhib before, though Maráthás and even Bráhmans come to see them, and bathe in the river below. While I was there, it began to thunder and grow cloudy, and I got a ducking ; but I do not regret my visit to the *Pípal-khorá,* and should like to repeat it. I am going to try if there are any more caves in the hills, of which we have not heard. I wonder how it is that none have been found in the *Satpudá* yet. No

natives of this country could, I think, have drawn the cave paintings—the Greeks or Italians must have helped them; and, indeed, at Elora, there is a woman's figure cut out in stone, of such fair proportions as to show it is the work of an artist, quite superior to those who executed the bulk of the unwieldy figures there.

"In the new caves I am alluding to, there is an odd neatness in the little sculptures I have mentioned."

These interesting notes of Captain Rose do not throw any light on the comparative age of these Buddhist excavations. It would be well if the paintings which they bring to light could be speedily copied.

The explanation of the peculiarities of the female figures which are noticed is not difficult. As the Buddhist religion in the ages of its glory prevailed not only throughout India, but throughout the countries lying to the north of its boundaries, and beyond the Indian Caucasus, and Tartary and Tibet, its *Buddhas* and *Dhyáni Buddhas*, and their other metaphysical productions or associates, the *Dhyáni-Bodhisatvas*, are frequently represented as attended by devotees and servitors of varied clime and colour. *Buddha* himself, and the *Dhyáni Buddhas*, and *Bodhisatvas*, in their typical form, as seen in India, Nepál, Ceylon, Barmah, Pegu, Siam, China, and Tartary, are depicted and sculptured with curly hair and rather large lips, which the Buddhists, according to a strange taste, enumerate among the points of beauty. Mr. Hodgson, of Nepál, when examining the learned priest whose answers form the substance of his most interesting and highly valued "Sketch of Buddhism," put to him the question—"What is the reason for Buddha being represented with curled locks?" and he received the following answer:—"Adi-Buddha was never seen. He is merely light. But in the pictures of Vairochana, and the other *Buddhas*, we have the curled hair; and since in the limbs and organs we discriminate thirty-two *lakshanas* (points of beauty), such as expansion of forehead, blackness of the eyes, roundness of the head, elevation of the nose, and archedness of the eyebrows; so also the waving curled locks is one of the points of beauty; and there is no other reason for Buddha's being represented with curled locks." Mr. Hodgson adds in a note—"This is the true solution of a circumstance which has caused much idle speculation, though the notion is no doubt an odd one for a sect which insists on tonsure!" The colours of the five *Dhyáni Buddhas* are as follows:—"*Vairochana's* appropriate colour is white; *Akshobya's* blue; *Ratna-Sambhava's* yellow or golden; *Amitábha's* red; and *Amogha-Siddha's* green. Those of their respective *Bodhisatvas* are correspondent.

It is to be hoped that Captain Rose will be able, as we remarked at the time of his discovery, to explore a considerable part of the *Indhyádrí* and *Satpudá* ranges, which have been hitherto much neglected, and in the latter of which no excavations have been yet found. The connexion with them from time immemorial of the aboriginal *Bhillas*, the *Phyllitæ* of Ptolemy's geography, who have submitted neither to Bráhmanism nor Buddhism, but who have so long preserved the Turanian worship of ghosts and demons, is no reason why we should not expect to find within it considerable numbers of Buddhist remains. The Buddhist monks could as easily conciliate by their largesses the wild sons of the Indian forest, as the monks of the eastern churches could conciliate the roving sons of the Egyptian, Syrian, and Arabian deserts.*

Of other caves in the same locality now noticed lately brought to light by Captain Rose, he kindly furnished us with the following account, on our meeting him in his camp, the *Kiblah* of many of the aborigines in Khándesh :—

"In a scarp of the hill near the Nizam's village of JINJALA, which is inhabited by a few Mewadis, and distant three kos from the British village of Mendhagaum, an image of Sheshái, the king of snakes, is sculptured, the head and neck being all that is visible above ground, with a cobra's hood extended behind the head, which has the face of a man. The remaining portion of the figure is concealed by earth and rubbish. Near this is the cave of *Ghatotkach*,† fifty cubits long by forty-nine broad, with a large [Buddhist] image and two small figures, one on either side of it, at the inner extremity. The cave has one principal entrance and four small ones, all facing the west. Outside the doors there is a capacious verandah, with three small apartments at either extremity. Inside the excavation there are a few small sculptures in the right hand front corner, where there is also a *ránjan*, or vessel of peculiar form. There are twelve small rooms round the cave inside, and twenty pillars are made to appear to support the roof along the whole centre, of which there is a natural figure.

* For the identification of the *Bhillas* with the Φυλλῖται of Ptolemy, we are indebted to the invaluable work of Dr. Lassen, of Bonn, the *Indische Alterthumskunde*, now publishing. The learned professor, too, identifies the Καυδάλοι of Ptolemy with the *Chandáls* of the Bráhmans—an agreement which we have long noticed. May their representatives not be found in the modern *Gonds*, who are still numerous about the sources of the Táptí and its affluent the Purná, to the east of the *Bhillas*? The Πωροῦαροι of Ptolemy are undoubtedly our serviceable friends the *Parwáris* or *Mahárs*, scattered throughout the *Maháráshtra*.

† The son of *Bhima*, the second son of *Pandu*.

"A new excavation was discovered near this one in August last; it also faces the west. As yet there is only an aperture sufficient to admit a man, who can sit inside with his head touching the roof. There are three doors and three small apartments beyond the large one, on its east side or back; their size could not be ascertained. The dimension of the principal room is ten cubits by six; and no paintings of sculptures are visible in it.

"Opposite the cave of *Ghatotkach* there are some excavations, called those of "*Hidimbá*."* The caves or entrances are said to be seven in number, though from the jungle only three or four are visible. No one has been into them for a number of years; and there is a tradition that out of ten men who venture there only nine return! On this account the Kárkun did not visit them. The Patel of Jinjálá had never seen them, and did not soon know of a road to them.

"In a scarp near Wákrí (Waisagad?) fort there is a cave twenty cubits by fourteen. It is devoted to *Rudreshwar Mahádeva*, and contains an image of Ganpati, with paintings or sculptures."

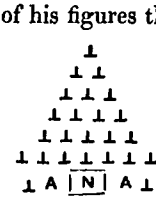
All these caves seem deserving of particular examination.

Connected with the same range of mountains, the *Indhyádrí*, we heard of several other series of undescribed caves, during a journey made at the beginning of the present year. From natives we learnt the existence of a set much filled up with earth, near the village of BOKARDAN, said to be about seven *kos* from the Nizám's village of Sáwangí, and about the same distance from Rahimábád. On the same authority we got notice of the existence of another set, of no great consequence however, at VETAL-WADI, ("the abode of a devil, Vetál,") transmogrified in some of our maps into the Arabic BEITALLAH, (the house of God!) a few miles west of Ajantá. These localities, though we were near them, our professional duties did not permit us to visit. From Major Gill we heard of another series of caves at PATUR, about 80 miles east of Ajantá, and 44 NNE. of Lunár.

To the east of the town of CHANDOR, and on the western sweep of the range now mentioned, and in the face of the hill on which the fort of Chandor stands, we lately discovered and visited a Jaina excavated temple, which has not hitherto been publicly noticed. On seeing the entrance to it from a distance, we made inquiries about it of the natives, who told us that it is only a small niche for *Káliká* or *Devi*. When we saw that they were by no means anxious that we should

* A *Rákshasi* celebrated in the Puránas, the sister of *Hidimba*, a *Rákshas* slain by *Bhima*.

proceed to it, our suspicions were aroused, and we forthwith made the ascent. On opening a door with which it was closed, we found it to be a small Jaina place of worship, dedicated either to *Párasnáth* or *Neminát*h, with about a hundred monolithic figures, great and small, hewn out of the living rock, though from the door to the principal idol on the interior wall the distance is only about twenty-one feet, while the height is only eight. The principal *Nátha* is squatted in a not unusual form, with the soles of his feet turned up, and his palms placed in an accordant position, so emblematic of the abstract and dreamy contemplation for which the Jaina and Buddhist devotees take so much credit to themselves. His image is about four feet high, and has the lion and *chakra*, or wheel, below. On one side he has two male, and on the other two female attendants, standing. Elsewhere he is honoured by the services of the brute animals, being mounted both on an elephant and lion, tamed by his sanctity. Near one of his figures the twenty-four *Tirthankars* are thus arranged :—



The unequivocal Jaina character of the excavation is thus revealed. One of its secondary *Náthas* has his sex changed, having been converted by the Bráhmans into a *Devi* by a liberal besmearment with unguents and paint ; and as such he is venerated by the people. *Devi*, indeed, is now the sovereign of the place. It was never intended, when the shrine was thus transmogrified in her favour, that it should be visited by *Mlechcha* antiquarians. The sculpture in this cave is not bad. It may be about the same age as the Jaina temples at Elora.

From this range we proceed south *per saltum* to the *Sayhádri* range, near KOLHAPUR.

CAVES NEAR KOLHAPUR.

The following interesting communication from Dr. F. Broughton, Civil Surgeon at KOLHAPUR, was addressed to us on the 10th of June 1851 :—

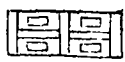
"MY DEAR DR. WILSON,—Since the receipt of your instructive Memoir on the Temples of Western India, I have visited two series of Buddhist caves, which have not, I believe, been before described, and may not, I trust, be deemed by you devoid of interest. The first

I will mention is situated in a hill called *Mhálasá Pathar*, a continuation of the Panhálá range, and distant from thence about six miles. The nearest village is called Badawárá, but the best mark for finding it is a white temple, conspicuous on the western border of the hill, and near which some curious marks in the rock, like the foot-prints of men and animals, are described by the natives as being the impressions made in a conflict there fought between the giants and demons. These caves of Pandu Harí are also celebrated as being the favourite retreat of the renowned robber chief *(rishi ?)* Jaimini, and their situation is well suited to such a purpose, as, concealed in a small ravine, and hidden by trees, none but the initiated are likely to be aware of their proximity. The excavations are formed in a semicircular scarp of amygdaloid, in a wooded ravine, the chord of the arc being 40 yards, and the aspect is due east. Near the centre, and approached by a flight of rudely cut steps, is a temple 30 feet wide and 40 feet long, by 7 in height, opening into an inner chamber 10 feet square, in the centre of which is a ruined block of uncut stone, the remains, I believe, of a *dahgob*. The roof is, or rather was, supported by six separate pillars, and six cut in half relief at the corners and sides; but the soft nature of the rock has been broken up by the growth of the roots of the trees, and the action of water, and the roof has given way, carrying with it many of the pillars, and nearly the whole of the verandah, which once evidently protected its front. To the right of this cave is another, 40 feet long, and 17 wide, being 7 feet 8 inches high, and supported by six pillars of uncut rock. In this is also an inner chamber, containing a mutilated pillar, on which a portion of squaring, and a cut line or edging are visible. In the area formed by the pillars in the outer apartment of this cave is a raised sort of chair, indicating a spot from which some figure has been removed. Much wanton mischief appears to have been committed in these caves, and the *linga* now occupies situations created by the destruction of the original design. To the right and left of these caves, cells about 6 feet square are found: two on the right are approached by steps, and are above the level of the larger caves; those on the left are also two in number, and contain stone seats, and are approached by doorways; and between the cells and the centre cave is some carving on the rock, indicating it as the posterior wall of a chamber which has fallen in. Two half-relieved pillars are surmounted by the following figure :—

To the extreme left is a natural cavern, extending far into the hill, and

from which a stream of a remarkably pure water flows, thus completing the requisites of the recluse.

" The caves of *Panhálá Dari* are situated close to the village of *Panhálá*, in a hill about seven miles from *Kolhápur*, and close to *Jotíbá's dongar*. They are excavated near the upper part of the hill, and the entrance is hidden by trees. They consist of a *chaitya* in the shape of a horse-shoe, 27 feet long, 16 feet wide, and 11 high, containing a *dahgob* 8 feet high, and 21 in circumference, in the centre of which some slight remains of carving are visible, as forming a circle round the pillar in this wise :—



" This temple and pillar, distinctly monolithic, and attesting the design of the excavator, corresponds exactly with the description you give of the *chaitya*, and will I hope authorise me in speaking so positively in my description. On the right of this cave is a spacious *vihára*, 44 feet by 41, but only 9 feet in height, supported by six pillars on each side, and approached by a door 7 feet high and 5 wide, and is lighted by two windows 4 feet square, on either side of the doorway. From the three sides of this hall there are entrances by narrow doorways into seven cells, so that there are altogether twenty-one separate apartments about 7 feet by 6½, and 6 feet high. Some of these cells contained seats, but are sadly dilapidated, as, in defiance of a verandah running along the front, the caves facing the south are filled with water during the monsoon.

" On either side of these caves are nests of cells, on the right hand leading the one into the other, on the left separate. There are four on the right, 6 feet by 4, and on the left three, and externally there are two *vinhás*, affording an abundant supply of water.

" These caves are fast going to decay, from the beforementioned causes, and also from the rain finding its way through the roof, there being only 15 feet of rock from the roof of the temple to the top of the scarp.

" There are some curious excavations also that have lately been cleared out by Captain Graham, in the fort of *Panhálá :* I do not myself consider them as having been used for religious purposes, but will describe them for your opinion. Descending by seven steps, and following a subterraneous passage 5 yards long, 6 feet high, and 2½ feet broad, the passage turns suddenly to the left, and after another couple of yards, describes a semicircle again to the left, and opens into a

chamber about 8 feet square, in which is an uncut seat. A doorway leads into another similar apartment on the left, in which is also a seat and a niche in the wall, for a lamp is found in both, which, from the blackened appearance of the rock, would seem to have been used. On the right is a similar sized room, in one corner of which is a deep pit, at the mouth of which a groove is carefully cut in the rock, into which stone of a different material is fitted, so as to close the entrance. Above the centre of the middle chamber is a square well-cut aperture, in fact a trap-door, on the two sides of which places have been cut to let in a bar, by which the aperture could be closed. The impression on my mind is that the staircase was cut to facilitate the formation of the retreat, and afterwards filled up, and the trap-door only used as the entrance. This subterranean abode could never have been a pleasant habitation, particularly when the door was closed above. That this door was closed is probable, by the blackened walls, where lamps have been used, and which would not be necessary if the traps were left open. From the evident design of concealment, both of the external aperture and the pit's mouth below, I am disposed to think it was contrived for the security of property, and sometimes probably as a refuge for persons in times of danger. This excavation is situated on the side of the *Koti*, and is now surrounded by villages. Its situation does not indicate any wish for retirement, as it is in the midst of buildings of all descriptions; but the object appears to have been concealment, and was, most probably, intended for treasure.

"I should be glad to hear your ideas on this point, and apologizing for the length of my letter, may I beg of you to make any use you think fit of the information it contains."

The Buddhist excavations here brought to notice by Dr. Broughton are the most southern in the Western Ghâts with which we are acquainted. We agree with Dr. Broughton in considering the last-mentioned as not being of a religious character.

CAVES IN KATHIAWAR.

During a visit to Káthiáwar, the peninsula of Gujárat, *alias Saurâshtra*, in 1851, we heard of the existence of several sets of caves hitherto publicly unnoticed. A list of these we received from Habib Khán, a Muhammadan gentleman of *Junágad*, to whom we have been indebted for information on several occasions, and whom we then met in the camp of the Political Agent of the province, Lieutenant-Colonel William Lang.

In the DATAR mountain, part of the Girnar group, there is an

artificial cave, in which ten or twelve persons may be accommodated. Like the víhár caves called the KHAPARAKHODI, at *Junágad*, in its neighbourhood, and those of *Talajá*, in the same province, which we noticed on a former occasion, and others now to be mentioned, it has no images, a circumstance to which we shall afterwards advert. The hardness of the primitive rock out of which it is hewn may account for the smallness of its dimensions, as compared with those in the sandstone below.

On the sacred GIRNAR itself there are two similar small excavations. The localities of the others we simply mention according to Habib Khán's notes :—

1. In the OSAM hill, near the temples of Mahádeva and Khandobá.
2. In the GOPINATH hill.
3. In the DHANK hill, one of considerable size, called the KHAPARAKHUDI.
4. In a hill near SETANA.
5. In a hill near KHADIA.
6. Near PATTAN, (Somnáth?) one called HINGLAJ.
7. In the SANA hill, in the district of the *Gir*.
8. At GORAKHMADHI and GORAKHNATH, probably in the same district.
9. In the KALA-HADYA hill, in the province of *Bardá*.

From Rámjí, a Mehta in the service of Lieutenant Black, one of Colonel Lang's Assistants, we received a memorandum of the existence of caves at the following places :—

1. Between the villages of KHADATI KHAN and KHAMARDAND, in the province of *Bardá*.
2. Near the large tank at SARDHAR.

Khachar Bhoj mentioned the following places as having excavations :—

1. In the SALEMAL hill.
2. At a place near WADWAN, called KHEMISA.
3. In the hill of KAKANDA, called MEWARDA.
4. In the hill of MANDAVA, called DEVESHWAR.
5. At DEVAGHARI, near the village of *Bhadalí*.
6. At BHOERA-GAD.
7. In the JOGI, near the village of *Kánámátrá*.
8. In the PALITANA hill.
9. At DWARKA.

Most of the caves in these lists are but of small dimensions; but this may be owing to the difficulty of working in the hard rocks in which most of them are constructed. It is hoped that particular accounts of them may be soon received from competent observers.

The number of caves which have lately been brought to notice in the West of India is altogether remarkable. Many, however, there is reason to believe, exist in various districts which have not yet been heard of by Europeans. With a view to encourage efforts being made for their being brought to light, the Bombay Government, with considerate liberality, has authorized the Cave Commission to offer rewards, varying from twenty-five to a hundred rupees, for the discovery of any series hitherto overlooked, according to its importance. By the promise of these rewards, European gentlemen interested in antiquarian research may probably induce some of their native acquaintances to make minute inquiries in the different districts to which they find access. Lieutenant Brett is engaged by Government, under the direction of the Cave Commission, in taking *fac-similes* of the cave inscriptions, which he does by an ingenious process by the use of gutta percha. Mr. G. S. Wilson has furnished the Cave Commission with specimens of *fac-similes* of some of them well executed in plaster of Paris.

AGE OF THE RELIGIOUS EXCAVATIONS.

Before leaving the religious excavations of Western India for the present, we must advert to the question, perhaps of most interest connected with them,—that of the time of their construction. On this subject we formerly made the following remarks:—

"Mr. Fergusson has made the important discovery that the Bráhmanical *Kailás*, which strikes the beholder as the most remarkable of the whole [of the Elora groups], is formed after the type of some of the structural temples of the south of India, particularly the great pagoda at Tanjor; and he says—'I have no doubt in my own mind that the Chola, or at least some of the Karnata Rájás were the excavators of this temple, and the restorers [rather propagators] of Sivite worship in the Dekhan; my own impression is, that we must ascribe this either to Rájá Rajendra or Keri Kala Cholan, and that consequently the date given by Mir Ali Khan to Sir Charles Malet is very near the truth, if applied to this excavation at least, and that it was made in the first half of the ninth century of our era.' Works of such magnitude as the Kailás temples would require the wealth and enterprize of such sovereigns as the Cholas were. The resources of the local princes, the Chalukyás of the Dekhan who preceded them,

and of the Devagíri Rájás who followed them, were quite inadequate to their execution, and that of the Elephanta and other Shaiva temples near Bombay. Somewhat posterior, in point of age, to Kailás, must be those Bráhmanical temples of Elephanta and Salsette, in which various imitations of the Bráhmanical excavations of Elora appear. Looking at them collectively, we have long, on mythological grounds, been disposed to limit the age of the Bráhmanical excavated temples by the eighth or ninth century after Christ. On several of their figures the small box, containing the emblem of Shiva, worn by the *Lingáits*, is represented, and the Lingáits did not appear in the south of India till considerable modifications were made in the course of time in the peculiar forms of Shaivism introduced or supported by Shankar A'chárya. The Chola Rájás were the patrons of the Lingáits, who, to the worship of Mahádeva or Shiva, add the practice of the *Yoga*, without reference to caste, with a view to final emancipation. Professor Wilson notices the profession of the Yoga in the eighth century, and he properly observes that the Bráhmanical temples in the subjects of their sculptures, and the decorations of Shiva and his attendants, belong to the same sect. It is remarkable that this form of the Hindu religion has vanished from the Maráthá country, which it is not likely it would have done had it enjoyed the continued patronage of the Devagíri Rájás reigning over this locality, the last of whom was overcome by the Muhammadans A. D. 1293.

"There are evidently imitations of parts of Kailás in the northern group of Caves at Elorá, commencing with the series nicknamed the Indrasabhá. These, then, must be posterior, in point of execution, to the first half of the ninth century. We agree with Mr. Fergusson in thinking that some of them, as stated in a passage which we have quoted from him in connexion with the Násik caves, belong to a period of transition ; but others of them we hold, both from their figures and emblems, to be decidedly the work of the Jainas, by whom at this day some of them are claimed, as that called Párasnátha. These Jaina excavations are probably the workmanship of the opulent Jaina ministers of the Rajput, Elichpur, and Devagíri Rájás. They are probably not older than the eleventh or twelfth centuries, when the Jainas of Western India made great efforts, as they are now doing, to extend their faith."*

A remarkable corroboration of the general views here stated, but one warranting a more definite adjustment of them, we obtained at Elora in

* Journal of Bombay Branch of the Royal Asiatic Society, Jan. 1850, pp. 83,84.

January 1852. When examining the Jaina excavation of Párasnáth, which is of the same workmanship as the larger Jaina excavations, we discovered an original inscription, a small portion of which in an incorrect form had been furnished to Dr. Bird, giving the date of its formation as *Shaka* 1156, equivalent to about A. D. 1234, which makes the JAINA temples at Elora 618 years old at the present time.

In the inscription referred to, the name of the hill in which all the Elora excavations are made is the *Virolla Parvat*, or Mount of *Virolla*. This word, we have little doubt, is formed from the name of *Vira-Chola*, one of the Chola Rájás, who flourished, according to one of the papers of the Mackenzie Collection, quoted by Professor H. H. Wilson, who mentions the extensive conquests of his race, about A. D. 917.* This gives an antiquity to the most remarkable of the BRAHMANICAL temples of Elora and those of Elephanta, which are of the same type, of about 935 years; or, to deal in round numbers, it makes them to fall at least within the present millennium. As formerly, we are still of opinion that the *Jogeshwari* Bráhmanical temples of Salsette are considerably more modern than those of Elephanta and Elorá. The sculpture and architecture of them, it struck us on a late visit to them, are not of the Southern Indian type, like those of the great works now mentioned, but of the Rajput or Gujarát types, as we see exemplified in various districts to the northward, as in Káthiáwár, Pattan, and Mount Abu. Of the same character is the remarkable structural Shaiva temple of Amarnáth, about six miles from Kalyán, which, though of hard black basalt, shows a delicacy of workmanship which could be attained only by artisans accustomed to work in softer stone, the marble of the north. Whether this work is to be attributed to the Devagiri Rájás, or the Rajput sovereigns of Anhalwárá Pattan, we shall not positively say.†

The age of the BUDDHIST excavations in the West of India remains to

* This theory of the hill receiving its name from *Vira-Chola* may explain the fact that it cannot be identified in the narratives of the Chinese travellers (written previous to its receiving this denomination), so ably analyzed by Colonel Sykes.

† Before we had visited the temple of Amarnáth, which, we would remark, is one of the most interesting objects for inspection in our immediate neighbourhood, we were inclined, from the drawings of it which we had seen, to reckon it of the same era as the Elephanta caves. The *Trimurti* which is found at it, however, occupies a very subordinate position. It is in one of its external niches. It is certainly grotesque enough, as formerly observed. But the supposed representation of clerical or legal bands on the breast of the front figure is a conceit of our limner. Instead of finding there the representation of a pinafore for a beard, we observed only the veritable facial vegetation of Brahmá himself, as embodied, with Vishnu, in the all-engrossing Shiva.

be noticed in our present connexion. We are not without data which may help us to an approximation to a satisfactory solution of this question also. The death of Shákya Muni, or Buddha, has on the most satisfactory grounds been fixed as occurring in the year 543 B. C. As has been well shown by Hodgson, Burnouf, and Lassen, the use of images, and the veneration of relics, were adverse to his own system, philosophically considered; and we may venture to say that all the excavations which have images and *dahgobs* as essentials of their construction must have been so far posterior to his removal as to leave time sufficient for the development of the veneration and mythical regard for him as a distinguished teacher which they embody. The excavations at Junagád, at the base of the celebrated mountain of Girnár, and proximate to the rock on which are engraved the well-known edicts of *Ashoka*, have no images; and, as we have seen, the want of images is a peculiarity, as far as known, of all the ancient excavations of the peninsula of *Saurâshtra*. None of the monasteries or temples in *Mahárâshtra* can be older than the arrival in the Maráthá country of the first Buddhist missionaries mentioned in the extract from the Mahavanso which we formerly adduced, and which missionaries were dismissed to their work in the seventeenth year of the reign of Ashoka, or 246 A. C.*

An allowance, in fact, must be made for a season of continuous

* For an elaborate investigation of all the dates connected with the origin and progress of Buddhism, see Lassen's *Indische Alterthumskunde*, vol. ii.

For the sake of connexion we may here repeat the extract from the *Mahavanso* to which we here refer:—

"The Illuminator of the religion of the vanquisher, the thero [patriarch], son of Moggali, having terminated the third convocation, was reflecting on futurity. Perceiving (that the time had arrived) for the establishment of the religion of Buddha in foreign countries, he despatched severally in the month of 'Kattiko,' the following theros to those foreign parts. He deputed the thero Majjhantico to Kásmira and Gandhára [Kandahár], and the thero Mahádevo to Mahisamandala [Mysore]. He deputed the thero Rakkhito to Wanawásí [in the north of the Karnatic], and similarly the thero Yona-Dhammarakkhito to Aparantaka. He deputed the thero Maha-Dhammarakkhito to MAHARATTA; the thero Mahá-rakkhito to the Yona [Bactrian] country. He deputed the thero Majjhimo to the Himawanta country; and to Sowanabhúmi the two theros Sono and Uttaro. He deputed the thero Mahá-mahindo, together with his (Moggali's) disciples Ittiyo, Uttiyo, Sambalo, Bhaddasálo (to this island [Ceylon]), saying unto these five theros, 'Establish ye in the delightful land of Lanká the delightful religion of the Vanquisher.'—*Turnour's Mahavanso*, p. 71. According to the *Mahavanso*, these missionaries obtained most marvellous success. Of the missionary to the Maráthá territory it is said:—'The sanctified disciple Maha-Dhammarak-

labour, before success was experienced by these missionaries. The southern group of caves at Elora, as formerly remarked by us, may be the oldest Buddhist establishment in the west of India. It is, comparatively speaking, in an open and easily approachable country, while the other establishments are principally in mountain recesses, which would likely not be penetrated till the Buddhist faith had made some progress in the adjoining districts. It is of great extent, and of

khito, repairing to Maháratta, preached the *Mahanáradakassapo jataka* (of Buddha). Eighty-four thousand persons attained the sanctification of *magga*, and thirteen thousand were ordained priests by him."—*Mahavanso*, p. 74.

These Buddhist missions took place immediately after the third synod of the Buddhists, in the reign of *Ashoka*, the *Dhammasoka* of the Mahavanso, and the *Devánám Prya Piyadasi Rájá* of the Girnar rock tablets, whom, *per incuriam*, we inconsistently confounded in a portion of our paper with the *Devanan piatisso* of Ceylon, (his contemporary during the latter part of his reign,) when we were offering a few remarks on the difficulties felt by Professor H. H. Wilson, in his able paper on these tablets, about the admission of their Buddhist character, which we have maintained from our first acquaintance with them.

Professor Lasson will excuse us for introducing the following extract of an interesting letter which we had the pleasure of receiving from him, under date the 22nd April 1851, bearing on the matters here alluded to:—

"I agree with you in identifying the king *Devanám Prya Piyadasi* of the inscriptions at Girnár and in other places, with *Ashoka*. Besides the testimony of the *Mahavanso*, I adduce, as a proof of their identity, the repetition of that title by his successor *Dasharatha*, with the difference that he usually adds his own name to distinguish himself from his predecessor. Another instance of a title being used instead of a proper name by the Buddhists is the name *Dharmawardhana* given to *Ashoka's* son *Kunála*. (*Indische Alterthumskunde*, ii. 270.) As *Ashoka's* authorship of the inscription found at Bhatra, in which he addresses the convention of *Magadha*, can hardly be doubted, it may be presumed that the others also are to be ascribed to him. The chronological difficulty that *Maya*, who died 256 B. C., is mentioned in an inscription dated 240, I am prepared to obviate by the supposition that *Ashoka*, shortly after his accession, had sent ambassadors to the Greek kings, and therefore recorded these names in his inscriptions. (*Indische Alterthumskunde*, ii. 242.) It is true that no allusions to any of the names of *Buddha* occur in them. *Stúpas* and *Viháras* are, however, spoken of in the inscriptions of Dhauli, and the Bo-tree appears with its sacred character in them. (*Indische Alterthumskunde*, ii. 256.) I may add that the prominent place which *Dharma* occupies in the mind of the author of the inscription (at Girnar) speaks for his having been a Buddhist, and that Professor Wilson's hypothesis, that the shadow of a name should have been made use of in order to give authority to the promulgation, appears to me highly improbable." Ashoka's claim to the inscriptions, on the readings of which much light has been cast by Professor Wilson's revised translation, must now, we think, be reckoned indubitable.

general simplicity; and it is evidently the nucleus around which as an ancient undertaking, the other excavations—Buddhist, Bráhmanical, and Jaina—have been aggregated. The excavations at Ajantá, it appeared to us on a late incidental visit to them, show indubitable tokens in their wondrous paintings—now being transferred to the view of Europe by the accurate pencil of Major Gill—of the influence of Grecian art, and were, in all probability, the work of limners from Bactria, attracted to India after the spread of Buddhism in the Trans-Indian provinces. Indigenous Indian art has at no period of its history, as far as we are aware, shown an approximation to them in point of propriety and excellence; and certainly it did not do so about the times immediately prior and posterior to the Christian era, if we may be allowed to form a judgment from the rude coins it then produced. On the lion-pillar fronting the great Chaitya excavation of Kárlá, we have found the name of the General (Náyaka) AGIMIT *(Agnimitra)* of the *Shunga* dynasty, which succeeded the *Maurya* to which Ashoka belonged;* and other traces of the same dynasty, to which Mr. Prinsep, in his Tables, gives a reign of 110 or 112 years, from A. C. 178 to A. C. 66. That these excavations were made about this period—when the Bactrian influence over India must still have been considerable—we have obtained striking proof in the discovery of the name of the Greek THEONIKOS, (probably the architect of the whole work,) in an inscription on one of the interior pillars.† Dr. Stevenson tells us that in the inscriptions at Kanherí, with which he has been lately busy, he has found traces of the posterior *Andhra* dynasty, which, according to the same authority, was from A. C. 21 to A. D. 408. We have discovered, on the other hand, a limit to the time of the power of the Buddhists, at least in most of the districts to which we refer, by finding in the *Rájáwali*, under the head of

* The inscription marked I, in the accompanying lithograph (plate xii.) of this Páli inscription, in Nágarí letters is अगीमीत नाकस सिंहथंभ दानं, *agimita nákas sinhathamb dánam*, the lion-pillar, the gift of the general Agnimitra (अग्निमित्र नायकस्य सिंहस्थंभ दानं.)

† This inscription, as taken by us some years ago, and communicated to Dr. Bird, will be found in the accompanying lithograph, marked II, and collated with the *fac-simile* of Lieut. Brett. When resolved into the Nagari letters, it reads thus:— धनक्कज यवनस सिंहधयानं थंभ.दानं *Dhanakkaj Yawanas sinhadhyánam thamb dánam*, (in Sanskrit धनक्कज यवनस्य सिंहधयानं स्थंभ दानं) the lion-bearing pillar, the gift of the Greek *dhanakkaj*. *Dhanakkaj* is as near an approximation to the Greek *Theonikos* as could be expected. On the Kárlá inscriptions we observe some valuable genealogical *documenta*, probably embracing also some hitherto unknown local dynasty.

Ujjayn, the name of *Khanderáo*, (the *Ráná Chandra* of Prinsep,) by whom, according to the legends of the Mhálasá Mahátmya (so called from Khanderáo's wife) of the Jejurí temple, in which he is deified, they were driven from the Maráthá country, and massacred in the Karnátik to the incredible number of *yelkot*, (still the watchword of the followers of Khanderáo or Khandobá,) seven crores. Khanderáo flourished about the year 620 after Christ. Posterior to this overthrow of the Buddhists are all the Hindu Puránas, or legendary works, which, by the commingleme nt of ancient traditions and modern fables, are intended to form the reproduction of Bráhmanism. It is probably from the share which the Maráthá Bráhmans had in the destruction of Buddhism, by urging on the exertions of their local princes, that they began to exalt themselves so much as they have done among the priesthood of India; which is the more remarkable as the body of them profess to be the followers of the Southern Shankar A'chárya, who did for Bráhmanism by the pen what Khanderáo did for it by the sword. It is curious to mark their pretensions and scrupulosities, as they are brought to notice in the *Sahyádri Khand* of the *Skanda Purána* :—

"The Brahmans are represented to be of ten classes; the five *Gaudas* and five *Drávidas*. Mention the origin of the whole of them in extension. Mahádeva says :—The *Dravidas*, *Tailingas*, *Karnátas*, *Madhyádeshgás*,* and the *Gurjaras*, are reckoned the five *Dravidas*. The *Trihotras*, *Agnavaishas*, *Kánya kubjas*, the *Kanojas*, and the *Maitráyanas* are accounted the five *Gaudas*. The ten classes of Bráhmans are produced from the Rishis. The customs of these vary in different countries, according to the extension of the earth. The *Gayatri*, *Vedas*, and *Karma* (works) are the duty of all Bráhmans. We have not (at present) to inquire into the ordinances pertaining to the six *Karmas*. In the matter of eating and feeding, the Bráhmans are in the place of all the Gods. The *Karmá* of marriage is regulated according to descent and genealogy. The *Desha-dosha* (or district-fault) of the *Gurjaras* is the using of water kept in skins. The great fault of the people of the *Dakshin* (South) is cohabitation with slave-girls. In the *Karnátik* they don't rinse the teeth; in *Kashmir* there is the prostitution of the wives of *Bhattas*; in *Tailinga* there is riding on bullocks; in *Dravida* there is eating in the morning without ablution. In these countries these are the faults which are to be reckoned.

* Dwellers in the *Madhya-desha*, or middle country, which is said to extend from Násik to Belgáum.

The *Gurjara* women are without the breech-band, and the widows among them wear spencers. The *Trihotras* and the *Kanojas* are eaters of flesh, and devourers of fish."* Here, it will be observed, the *Madhya-deshgás* have no fault whatever.

The period of the Buddhists in the West of India, we may conclude, on pretty sure grounds, extended from the middle of the third century before, to the middle of the seventh century after Christ, when Bráhmanism, by the sword of Khanderáo and its other heroes, recovered its ancient power, and assumed the form in which it now appears. A defendant of Buddhism overcome by Khanderáo appears to have been a person named *Mala*, a *Daitya* or Titan according to the legend, who was slain by Khanderáo. To the second and first centuries preceding the Christian era we are warranted in ascribing the more remarkable Buddhist excavations in our neighbourhood, though some of them may be of a somewhat posterior date.

Structural Temples.

The fruits of our research under this heading, since the publication of our first Memoir, are but very scanty.

The remarkable Bráhmanical temple of *Ambarnáth*, about six miles from Kalyán, probably coeval with the excavations at Jogeshwar, in Salsette, we had an opportunity of visiting in March 1852, with Messrs.

* The Sanskrit of this curious passage, from the first chapter of the *Uttara Rahasya* of the *Sahyádri Khanda*, we subjoin, as the work from which it is extracted is extremely rare :—

ब्राह्मणाः दशधाः प्रोक्ताः पंच गौडाश्च द्राविडाः ॥ तस्य सर्वस्य उत्पत्तिं कथयस्व सुविस्तरं ॥ १ ॥ महादेव उवाच द्राविडाश्चैव तैलिंगाः कर्नाटमध्यदेशगाः ॥ गुर्जराश्चैव पंचैते द्राविडाः पंच कथ्यते ॥ २ ॥ त्रिहोत्रा दशवैशाश्च कान्यकुब्जा कनोजयाः ॥ मैत्रायणाश्च पंचैते पंचगौडाः प्रकीर्तिताः ॥ ३ ॥ ब्राह्मणा दशधाचैव ऋषिरुत्पत्तिसंभवाः ॥ देशदेशविधाचाराः एवं विस्तरते महो ॥ ४ ॥ सर्वेषां ब्रह्म गायत्री वेदकर्ममयो विधिः ॥ षटकर्म विधियुक्तेन नाच तस्य विचारणा ॥ ५ ॥ भुंजित्वा भोजयित्वापि सर्वदेवेषु ब्राह्मणाः ॥ योनिसंबंध कर्मैव स्वशाखा सूत्र मंत्रयः ॥ ६ ॥ चर्मांबु गुर्जरे चैव देशदोषं प्रकल्पयते ॥ दक्षिणे दासिगमनं दोषं चैव महद्भुतं ॥ ७ ॥ न दंत धौतं कर्नाटे काश्मीरे भट्टभारिजः ॥ तैलिंगे गोवाहनंच प्रातरस्नंतु द्राविडे ॥ ८ ॥ एवं देशेच दोषाश्च स्वदेशेच प्रकल्पयते ॥ गुर्जरो कछपाहीना विधवाच सकंचुकीः ॥ ९ ॥ त्रिहोत्राश्च कनोजाश्च मांसभुक् मछभुंजकाः ॥ कान्यकुब्जा भातृगामी देशदोषाश्च जायते ॥ १० ॥

Grant Duff, in his History of the Maráthás, (vol. i. p. 11,) speaking of the *Chittpáwan*, or *Konkanasth* Bráhmans, says :—"They carefully suppress or destroy all copies of the *Sahyádri Khand*, where their origin is mentioned, and a respectable Bráhman of Wái was, a few years ago, disgraced by Báji Ráo, for having a copy of it." The work, there can be little doubt, was composed by the Bráhmans of the *Madhya-desha*.

Smith and McCulloch; and we were all greatly struck with the excellence of its architecture. We have already noticed it incidentally in this paper.* It is well worth the attention of visitors from Bombay, who will soon find conveyance to its neighbourhood by our new railway.

It is about the discovery of the remains of structural Buddhist temples throughout the country that we have felt the most interest. Several such, we have been assured by Col. Twemlow, have been converted into Muhammadan mosks at Rozah, above the caves of Elora. For our satisfaction, when we were last there, the Brigadier caused considerable excavations to be made in the *Kálá Masjid*, to which he found access by persuasion, backed by golden arguments. Their result was the discovery of the fact that that place of Muhammadan worship had undoubtedly at one time been a temple of Shiva, probably taken from the Buddhists, its original founders, by the Bráhmans. At the neighbouring village of KADIRABAD two images of Bhawání, executed in the exact style of the Bráhmanical figures at Elora,—one of which was procured and presented to us by Colonel Twemlow,—were ploughed up a short time before our visit. The diggings which were afterwards effected at the place revealed indisputable traces of an ancient temple. Some small images of Buddha, and other remains of one of his shrines, we noticed built in the walls near the gate of the town of PHALMARI, about fourteen miles distant from Rozah, on the way to Ajanta. Buddhism seems to have thoroughly pervaded the Maráthá country during the days of its triumph in India.

Ancient Sites.

Colonel Twemlow directed our attention to various indications of a very extensive town having existed in very remote times in the neighbourhood of Rozah. The legends current among the natives respecting its origin are very absurd. They attribute its foundation to *Yuvanaswa*, one of the earliest kings of the Solar dynasty; but in his times, even if they are not entirely mythical, none of the Aryan kings had settled in this part of India. A sovereign named *Purchand Ráy* is, in their traditions, also connected with it. Some of the Musalmans absurdly enough couple it with the Queen of Sheba, whose capital has been identified with the town now bearing the name of *Mareb*, in Arabia Felix.

Of the extent of the ancient city of Rozah, Colonel Twemlow thus writes, in a letter forwarded to the Bombay Government, on his receipt of our first Memoir:—"If a visitor to Rozah stands on the high

* See page 369.

mount east of the Saracenic gate of entrance to Rozah from the north, (on which mound there is one tree,) and thence looks east towards an ancient lake or tank, called 'Sultán Taláo,' he will observe the ruins of the northern inner wall of the city, the ridge west of the Saracenic arch being the prolongation west. If he passes his eye over the modern town of Rozah (which occupies merely a small part of the site of the vast old city), he will see in the distance the fortress of Daulatábád: all the intervening plain for about six miles must have been covered with buildings of the old city. The central bázár, Chabutra, is on a mound, with a tree growing out of the terrace, about a mile or so north of the village of Kághaswárá. Daulatábád, and the scarped hills which run from the fortress towards Aurangábád, probably constituted the outer defences on the south. The visitor should then proceed through the modern town of Rozah to visit an ancient reservoir of the city: he will be conducted to it if he asks for the '*Ganj Ráwan Sálah*' or the '*Pari Taláo.*' It is situated about two miles south-west of Rozah. It has about fifty ranges of cut stone steps, arranged in a semi-circle, and was fed by six lakes or tanks of supply, formed in the hills west of it by successive *bands* across two valleys. The site of this old city, and perhaps its traditional history, must have pleased Mahmud Taghlak Sháh, who twice attempted to force the population of Delhi to remove to it. The mint or *Taksál* of this king was close to the *Pari Taláo.* In this mint were coined the mohurs and rupees (of copper gilded and silvered over) that formed the fictitious currency which enabled the Taghlak kings to give away their lakhs. When this dynasty declined, these copper coins became of but little value. They are turned up by the plough of the modern cultivator. I sent twenty-five of them to Sir John Malcolm when Governor of Bombay, and some of them will in all probability be in the Museum of the Society."

Among the ancient sites formerly pointed out by us as specially worthy of notice is WALABHIPUR, in Káthiáwár, or the peninsula of Gujarát. Our wishes respecting an examination and description of this remarkable place, generated by the allusions to it of Colonel Tod and Dr. Alexander Burn, have been fully anticipated by the publication in part 1 of vol. xiii. of the Journal of the Royal Asiatic Society of the interesting notes of B. A. R. Nicholson, Esq., of the Bombay Medical Service. An incidental visit which we paid to the place in January 1851 along with the Rev. James Wallace gave us an opportunity of observing the accuracy of Dr. Nicholson's paper when it came into our hands. On the occasion here referred to, we had all

due assistance given us by the Gohel chief to whom it belongs. He had neither seen nor heard of any of the copper-plate grants which throw so much light on the dynasty which made it its capital after the subversion of the *Sak* kings of *Saurâshtra*, and the names of the members of which have been re-arranged on pretty sure grounds by the Rev. P. Anderson in No. xiv. of our Journal.

About two stages to the southward of *Walabhi* lies the town of SIHOR, also mentioned as a place of great antiquity by Colonel Tod. Our visit to it convinced us that the Colonel has not formed a mistaken judgment respecting it. The ancient name of the place was *Sinhapur*, from which the modern name is obviously derived. We are disposed to consider it the capital of the *Sinhas* who made the first *Aryan* invasion of Ceylon—from which it, perhaps, received the name of *Sinhaldwip*,—and the seat of whose authority, we concur with Professor Lassen in thinking, must have been in Gujarát. We make another conjecture respecting it. It was probably the capital of the *Sak* kings (*Sinha*, as Mr. E. Thomas supposes,) of *Saurâshtra*. Their coins we found wholly unknown in the locality. Though they have been procured in many parts of India, from Kach,—where they have again been lately found by Major LeGrand Jacob,—to Elichpur and Nágpur,—from which places specimens have been forwarded to us by Brigadier Mackenzie, N.A., and the Rev. Stephen Hislop,—it is remarkable that none of them have been known to have been found in the peninsula of Gujarát till a few months ago, when some were brought to the notice of Colonel Lang, who has sent them to us for inspection. These coins, which have been so ably dealt with by Mr. Thomas, bear evident marks of Grecian influence. Of the *Sak* kings we may get additional information when Professor H. H. Wilson publishes his version of the latest of the Girnar tablets, which is looked for with great interest.

Ancient Sepulchres.

Most able papers on the most interesting class of these remains have been received from Captain Meadows Taylor, the continuation of which will appear in this number of the Society's Journal. He denominates them the "Druidical" or "Scytho-Druidical Remains." They are found in several places in Southern India. There can be no doubt of their great antiquity. With a rather striking illustration of this fact we conclude this paper.

Some months ago certain Funereal Remains, which had been found by Commander Jones, I. N., and Mr. Hall, in the mount of Gehráreh,

near Bagdád, were forwarded to the Society by the Bombay Government. Having been asked to report on them, we expressed our desire, in the first instance, to obtain some further information from Commander Jones as to the situation in which they were found; but on further considering them, and comparing them with certain figures illustrating an article in a late number of the Journal of the Royal Asiatic Society, we made the following statement respecting them on the 15th July last:—

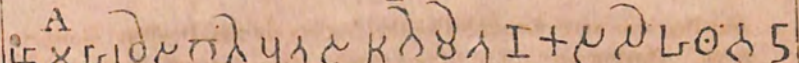
"With reference to my note of the 10th of June on the Funereal Remains from Gehráreh forwarded to Government by Commander J. F. Jones, I. N., I beg to direct the attention of the members of the Society to the annexed drawing of these remains made by a Hungarian friend, and the close resemblance in form of the coffin-shaped trough of clay to another of the same material and position, east and west, found by the late Captain Newbold in a granite tomb, which had been covered by a cromlech among the ancient sepulchres of Panduvaram Dćwal (temple of the Pandavas) near Chittur, in North Arcot, as described in a paper from his pen, published in the first part of volume xiii. of the Journal of the Royal Asiatic Society just received.

"Speaking of this sarcophagus, Captain Newbold says:—'It was a coffin-shaped trough, rounded at the extremities, and deeply rimmed at the edges, 6½ feet long, ten inches deep, and from 1 foot 10 inches to 2 feet broad. It was filled with hard earth and human bones. At A, which lay to the east, were the fragments of a skull and pieces of pottery. It stood on eight terracotta legs, which rested on the floor-slab of the tomb, 1 foot 3 inches long, and about 3½ inches in diameter at top, tapering gradually at the bottom, which terminates in two convex rims. Beneath the head of the sarcophagus, on the floor-slab, stood a small elegantly-shaped vase of fine black clay, filled with ashes and earth. Others, of common red terracotta, stood below, which were filled with earth. The villagers state, they have found rice in them.' The dimensions of the Gehráreh coffin appear in the drawing to which I have referred. The identity of the shape, and the correspondence of material, and of the breadth of the rim, with those of that found by Captain Newbold are certainly very remarkable.* Captain Newbold's sepulchres are those of the series denominated the Scythian, which have been found in various parts of the South of India. 'Whose bones, then,' he asks, 'do these huge blocks of granite cover? Throw down one of the side slabs, with its circular aperture,

* See accompanying lithograph. (Plate xii)

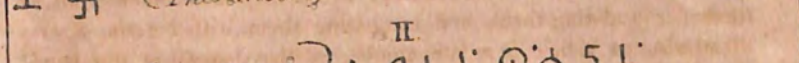
A

I.



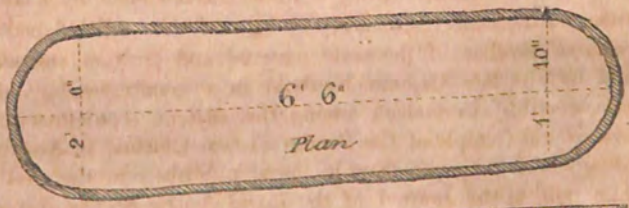
(This Inscription is in one line)

II.



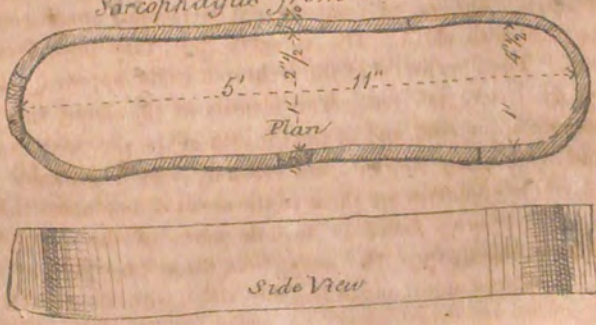
The coffin-shaped trough of Pánduwaram Dewál.

B



Scale 1: 24

Sarcophagus from Gehrárah.



of the sepulchre of Panduvaram Déwal, and we have the cromlech or dolmen. Clear away the cyclopean superstructure, and we behold the Druidical circles and the cairn. If we turn our eyes northerly to the mountains of Circassia, we there start with surprise on seeing an absolute fac-simile of the mysterious tombs of Southern India, with the circular aperture. (Vide Engraving in Bell's Circassia.) The Circassian sepulchre is similarly beyond the reach of history. Nor is it difficult to find a family resemblance to the Indian circles and mounds, with their contents of human bones, spear heads, ashes and pottery, in those which so thickly stud the vast steppes of Tartary and Northern Europe. They appear to me to be the almost only tangible vestiges remaining to us, except Holy Writ, of certain similarities in the languages of nations now wide asunder, and the traditions which prevail in almost every Eastern nation of an extensive migration, at a period of high antiquity, of one family of the human race, radiating in various directions from one given centre, at a time when the whole earth was of one family and of one speech, which the Lord confounded, and from thence did scatter them abroad upon the face of all the earth : in a word, they are the foot-marks of the builders of Babel—witnesses of the truth of sacred history—all eloquent in their silence, similarity, and distinctness.'

"It is curious that in the neighborhood of Babylon itself here referred to, a sarcophagus has been found exactly agreeing with that procured in India. The fact I think well worthy of notice. With the information which we have already elicited from Commander Jones, it may aid us in coming to a conclusion respecting the remains forwarded by him to India, and our finding a new proof of ethnographical connexion in remote times."—J. W.

Our learned member Dr. Buist has directed attention to the oriental character of certain of the monumental antiquities of Northern Europe, delineated by Mr. Chalmers of Auldbar.

It is in the elucidation of ethnographical relations, and national and religious history, that our antiquarian researches have their highest value.

P. S.—1*st February* 1853.—Since this paper was put in type, we have received some interesting notices from Dr. W. H. Bradley of the caves near *Vetálwádi* and *Bokardan*, of the existence of which, as we have elsewhere mentioned, we heard for the first time in February last. A more detailed account of these discoveries we hope shortly to receive from Dr. B.

Mr. Fallon, after painting the figures at Elephanta in a masterly style, has entered on the delineation of those at Kárlá.

ART. IV.—*Notices of Cromlechs, Cairns, and other Ancient Scytho-Druidical Remains in the Principality of Sorapûr.* By Captain MEADOWS TAYLOR.

Presented October 1852.

IN a former communication I submitted to the Society some remarks upon the ancient Celtic-Scythian or Druidical Remains of the Sorapûr District, and having understood from the Secretary that further details, accompanied, if possible, by plans of the various localities, would be acceptable, I have completed them as far as practicable, from time to time, and as I had opportunity during district tours, and now beg to transmit the result.

It has been very satisfactory to me to observe that the subject has excited considerable interest among antiquarians; and all the successive investigations I have made have only the more strongly served to impress me with the belief, not only that the remains I have discovered here, and those that have been discovered by friends with whom I have been in communication in other parts of the country, are identical with those on the Nilgherris, but supply ample proof that they belong to the same race of Celtic-Scythian people, who, at a very early period in the history of man, penetrated westwards into Europe, and of whom such peculiar and striking memorials exist. I need not here recapitulate the grounds of this supposition—which are detailed in my former communication—further than to state, that as in Europe, the remains here are divided into three general classes :—

1*st.*—*Cromlechs*, or erections of large slabs of stones, generally open at one side, and formed of three large slabs for walls, and one for a roof. All the cromlechs I have seen are empty.

2*nd.*—*Kistvaens*, or erections smaller than the cromlechs, constructed on the same principle, but closed on all sides. In some of them a circular hole, from six to nine inches in diameter, exists in one of the sides; and on removing one of the side-slabs, and opening out the interior, it is found to contain earthen pots, glazed with a red or black colour, which contain charcoal, earth, and portions of human bones and ashes—evidently the remains of

the dead, which were collected after cremation, and finally deposited in these sepulchres. I may remark that these pots or urns are found covered with fine earth, which was probably placed over them as they were successively deposited. Whether it may be attributed to the greater age of the kistvaens over the cairns, or that more water or damp has found its way into them, I cannot say; but though I have opened many kistvaens at Rajăn-Kolur and Hăggăritgi, I have not succeeded in obtaining any perfect urns from them, those that were found being so decayed and rotten that they could not be separated whole from the earth in which they were imbedded.

3rd.—Cairns, or small tumuli, surrounded with single, double, and treble circular rows of large stones or rocks; of which, as regards contents, there were two varieties. In some, as at Jiwargi, Andôla, &c. bodies have been buried, the skeletons of which are discoverable on excavation, accompanied by small and large urns, jars, fragments of iron weapons, tripods of iron, arrow and spear-heads, all the iron articles being very much decayed. Many of the smaller earthen vessels have been recovered in a perfect state from cairns which I have opened, and are well finished specimens of pottery, having a black or bright red glaze, or in some partially black and red inside and out. These cairns are by no means confined to the interment of one body: in some two, and in others remains of many adults and children could be traced, by the pieces of skulls and bones; while it was evident, also, that the children had been burned, and their bones and ashes interred in urns. In some cairns it was found that the bodies had been placed upon the natural floor of the grave, and the earth filled in; but in the larger cairns there are cists or stone coffins, formed by slabs of limestone, with upright sides, and slabs as covers and for flooring, forming two and three coffins adjoining, in which were skeletons resting upon the ground-slabs or floor. Above the covering remains of other skeletons were found in some instances, particulars of which will be more fully noticed in their proper places. These cists or coffins were usually found at a depth of from twelve to fourteen feet from the surface, and it is evident that great care and labour was bestowed upon the construction of the graves. The other class of cairns, which do not differ in outward appearance from the others, contain large earthen pots or urns, of the same description of pottery, red and black, which are filled with charcoal and human ashes, and portions of bones and earth, evidently showing that after the burning of the dead the remains were collected and deposited in these cairns, as they were deposited in the kistvaens. From the above result it may be

assumed that there were two sects of the same people, one of which burned their dead, and deposited the remains in kistvaens or cairns, and the other which buried their dead, and with them the weapons of the deceased, with probably funereal offerings of grain, &c. which were placed in the urns or jars, which in some instances nearly surround the stone cists in which the skeletons lie.

4th.—To these remains I am enabled from my investigations to add a fourth, which I have nowhere seen noticed before. There are large rocks, which have been placed regularly in diagonal lines, having open squares between each four rocks, the spaces in the squares being, most probably, and as will be explained more fully hereafter, intended for cairns. These remains are in many respects most curious and interesting: there might be doubts, perhaps, of their belonging to the same race, whose places of sepulture are so remarkable, if there were not cairns mingled with the rocks, showing, as will be seen by the plans, that they were placed as they exist by the same people.

The remains hitherto discovered by me exist in seven talooks or pergunnas of the Sorapûr State—*Koṛikăl, Hunsgi, Malgătti, Răstapur, Mäddarki, Andŏla,* and *Nelŭugi.* These adjoin each other, and reach from the SW. corner of the Sorapûr territory in an irregular manner to the N. and NW., and from the Krishna river to the Bhima. It is evident that some spots were more favoured than others—whether as having been more sacred as burial-places, or whether as being near the location of large and permanent encampments, it is difficult to state. In the large cemeteries, as at Rajän-Kolur and Jiwargi, the remains cover a large space of ground, and are very numerous; at the others, as will be seen by the plans, they are of smaller extent. In all situations, however, and whether in large or small groups, they perfectly preserve their several distinctive characters. I shall commence with the Korikăl talook, and take the others in order as they occur.

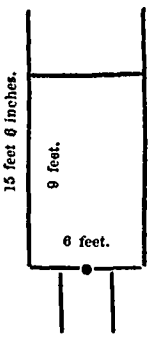
PLAN I.—CAIRNS AND KISTVAENS AT HAGGARITGI.

These are situated on a waste piece of land of a dry and gravelly character, about a mile and a half south of the village, near the bank of the Dône river: the ground slopes gently to the south, and is partially covered with low trees and bushes. There is cultivation all round the spot adjoining, and among the cairns, many of which have been disturbed by the plough, but the kistvaens have been respected. There is no cromlech at this place. Of the twenty-three kistvaens, some are of large size, others much smaller. They are constructed of slabs of grey

M.T. del. E.de Lith.

KISTVAENS NEAR RAJAN-KOLUR.

limestone, obtained from the eminences near, and these, in some instances, are of considerable size, and must have been transported with much difficulty and labour. Except in one instance, there is no difference in the arrangement of the erections here and at Rajăn-Kolur: they are four large slabs of stone set upright in the earth, and covered by a fifth, which projects over the walls, forming effectual protection from the rains. One kistvaen is, however, as remarkable for its size as for a peculiarity in the entrance, which I have not noticed elsewhere, and which may be thus illustrated:—



The front slabs form, as it were, an entrance enclosure in front of the sepulchre: the dimensions of the side slabs are very remarkable, being 15 feet 6 inches long, by 6½ feet high, and 4 inches thick. They are let into the ground about 2 feet, so that the erection was about 5 feet high in appearance. It had slabs laid down for a floor. This kistvaen was the most finished of any, and the most perfect. The sides appeared to fit closely, and there was no appearance of damp or decay; but on examination it yielded nothing but the remains of pots or urns, none of which could be got out entire, with portions of bones, ashes, and charcoal, mixed together. I much regretted afterwards that this fine specimen had been disturbed and broken in the examination, not having been present when it was opened. Two others were also examined, with the same result, but no cairns. It is evident, however, from their being in the same locality, that all belonged to the same tribe, and that it was of the sect which burned their dead, and buried their ashes. No remains of weapons, beads, arrow-heads, &c. were found in the kistvaens, and as the pots or urns which contained ashes and bones were for the most part much broken, it was almost impossible to discover how many had been deposited in each erection. In the largest there were distinct traces of seven large pots, with portions of others of smaller size, the number of which could not be ascertained. Some of the other larger kistvaens have sides measuring 13, 12, 10, and 9 feet respectively, by 4 to 7 feet broad or high, and the top-slabs in proportion. I did not measure the smaller ones, which are generally from 6 to 8 feet long, and 4 to 5 high.

PLAN II.—CROMLECHS AND KISTVAENS AT RAJAN-KOLUR.

This very remarkable group of remains was the first which I had observed in this district; and though I had passed it on several occasions,

each time with increased conviction that they could be no other than Celto-Druidic, from their exact resemblance to those in Wales, I forbore to come to any conclusion. On visiting them, however, in the latter end of 1850, in company with the late Dr. A. Walker, during a geological excursion, I halted at the village, and devoted some time to their examination. This convinced me that there was at least a curiously strong analogy, if no more, between these cromlechs and those of Wales, so strong that it amounted almost to conviction of their identity ; and on Dr. Walker's return to Hyderabad he sent me the number of the *Madras Journal of Literature and Science* (No. xxxii.) in which Captain Congreve's able article on the Druidical Remains on the Nilgherris is published. Perusal of this interesting narrative and detail left no doubt whatever on my mind in regard to my previous supposition. The style and plan of erection of these monuments—their size and contents—the peculiarity of the round hole in one of the end slabs of some of the kistvaens (for it is not universal)—the same traditional belief that they were the houses of fairies or dwarfs a span high, but endued with enormous strength, peculiar alike to Sorapûr, the Nilgherris, Britain, France, &c., agreeing so minutely and perfectly in every locality—all combined to induce me to make the Society acquainted with the discovery of Druidic antiquities in the Dekkan which had not before been noticed, or suspected to exist.

The dimensions of these remains are very various, in fact of all sizes, from the largest cromlech, of which the south side is open, to the smallest possible enclosure, made by four slabs of stone, not exceeding in some instances 2 feet square, if so much. The plan of the erections is similar to those at Häggäritgi in all respects—that is, when open, three large slabs let into the ground, with a top-slab ; and when closed perfect in its four sides and cover. The dimensions of the largest were—

Side-slabs.....15 feet 3 inches long, each.
9 feet 4 inches high, of which 3 feet, more or less, are let into the earth.
8 to 10 inches thick.

Top. .....13 feet 9 inches long.
13 feet broad.
9 to 12 inches thick.

End-slab... ...6 feet broad.
9 feet high, including what is in the ground.
9 to 10 inches thick.

The interior of this cromlech measures more in length and breadth

M.T. del.

F. de J. lith.

LARGE KISTVAENS RAJAN-KOLUR.

than the others, and is 6 feet by 9 ; but in others, and in the generality of the largest closed cromlechs or kistvaens, the interior space is 6 feet long by 4 broad, in which, as before stated, the funeral urns are deposited. A sketch of this cromlech is marked No. 1. The dimensions of two of the largest kistvaens are respectively :—

Side-slabs...12 feet by 9.
Top.....12 feet by 10 feet 6 inches.
9 to 12 inches thick.
Side-slabs...12 feet 9 inches by 9 feet.
Top.....13 feet 3 inches by 10 feet 9 inches.
1 foot to 9 inches thick.*

These two appear, one to the right and one to the left of Sketch No. 2, and that in the centre is about the same dimensions. Sketch No. 3 shows some of the smaller kistvaens in another part of the ground, and No. 4 part of the group nearer the village of Rajän-Kolur. In this sketch the cromlech partly shown on the right hand is nearly, if not quite, as large as the largest of the main group, and is higher, but it is not so neatly constructed. Some of the others shown are partly open and broken, the sides and tops of some having fallen in, or been removed.

It is impossible to view these numerous remains without being impressed with a sense of the enormous labour required in their construction, and in the transport of such huge masses of heavy stone. The stone employed is a schistose grit or sandstone, which occurs in a bed

* NOTE.—Compare the above dimensions with those of two cromlechs in the island of Anglesea, as quoted by Captain Congreve :—

" In the woods behind Plas Newydd, near the Menai Strait, are some very remarkable Druidical antiquities. Amongst them are two vast cromlechs. The upper stone of one is twelve feet seven inches long, twelve broad, and four thick, supported by five tall stones. The other is but barely separated from the first, and is almost a square of five feet and a half, and supported by four stones. The number of supporters to cromlechs is merely accidental, and depends upon the size or form of the incumbent stone. These are the most magnificent we have, for a middle-sized horse may easily pass under the largest. In the woods of Llugwy, indeed, there is a most stupendous one of a rhomboidal form. The greatest diagonal is seventeen and a half feet, the lesser fifteen, and the thickness three feet nine inches, but its height from the ground is only two feet. It was supported by several stones. In the woods at this place are some Druidical circles nearly contiguous to each other."

The large Rajän-Kolur cromlech would, therefore, appear to be a finer specimen than either of these, which are, I believe, the largest in Great Britain ; the thickness of the upper slabs, in comparison with those of Rajän-Kolur, is the only superiority.

lying between the limestone bluffs above Rajăn-Kolur and the granite ranges to the S. and SW., from half a mile to a mile and a half broad. The bed, when nearest the granite, is very hard in texture, shows a strong lustre on fracture, as if it had been partially fused by heat, or granitized, and it is from these portions, which cannot be nearer than a mile and a half from the spot where the erections have been made, that the largest slabs have been raised and conveyed. The sandstone changes its quality when not in contact with the granite, and is softer and more friable. It appears to resemble, if it be not identical with, the Bunter Sandstone, and is traversed by coloured bands—pink, grey, purple, and yellow.

To have removed these masses at all must have required peculiar mechanical skill, as well as great application of force and labour; and their transport for so long a distance, and erection, particularly in the placing of the covering slabs, is almost unaccountable, with the means we may suppose a rude and pastoral people may have possessed. All things considered, this group is by far more remarkable that than of Hăggăritgi, and in relation to the number and size of the cromlechs and kistvaens, may fairly take its place with the most remarkable of any of these remains hitherto discovered, whether in India or in Britain, France, Denmark, &c. None of the erections on the Nilgherris appear to approach them in size, and those opened by Captain Congreve agree with the dimensions of the middle and smaller sizes of the Rajăn-Kolur and Hăggăritgi groups. It will be observed by the plan that several cairns are intermingled with the stone erections, thus connecting the two as belonging to the same people. Several of these have double circles of stones, and have been carefully constructed; others are with single rows, and are less complete. I have not been able to examine any of these as yet, but I should presume, from trials elsewhere, that they would be found to contain funereal urns only; and the ground on which they are is so hard, that as excavation of it to any depth would have been impossible, the urns have most likely been placed upon the rock, and covered with earth and loose stones, and have, therefore, most probably become decayed by the action of damp: it is only when they have been interred at a considerable depth from the surface that I have found them perfect. The whole of the ground covered by the erections is rock covered with a shallow surface of moorum, into which the slabs have been fixed, resting upon the rock; and this may account for the entire preservation of most of them. None of them, in the large group at least, appear to have been disturbed or examined at any time, and they are respected

by the natives of the vicinity as the houses of the dwarfs, termed Morás, who inhabited the country in former ages before man. Locally they are known by the designation "Mora Mannee" or Morás' houses, but I have not been able to obtain any definition of the term "Morá." The main group stands on a slightly elevated spot with a gradual slope to the south, about half a mile SW. of Rajăn-Kolur, and near the high road to Korikăl. The smaller group is nearer to the village, and adjoins the high road.

PLAN III.—CROMLECHS, &C. NEAR BELSETTIHAL.

This village is situated about three miles NE. of Rajăn-Kolur, on the high road to Sorapûr, and the remains are near the range of limestone hills about half a mile WNW. of the village. There are very few of them entire, portions having been broken down and carried away, apparently for the slabs of stone; others have fallen in. Some of them are small open cromlechs, and others kistvaens of the medium size of those at Rajăn-Kolur, and none present any particular features for remark. The erections have not been arranged upon any plan, but are scattered over in a long irregular line near the hills, and at their base. I did not think them of sufficient importance to have any opened or examined, but in respect to construction and appearance there is no difference between them and those at Rajăn-Kolur. If possible, from their ruined condition, they may be more ancient than the others.

PLAN IV.—CAIRNS AT CHIKANHALLI.

In the month of October 1851, when taking levels and surveys for the bund of a new tank near the village of Chikănhălli, which is about nine miles from Sorapûr, on the road to Talikota, *viâ* Bohnal, I came very unexpectedly on a considerable group of cairns, which are situated on a small gravelly spur of a rock-granite range of hills about half a mile NW. from Chikănhălli. These cairns, large and small, are twelve in number, and are for the most part carefully constructed, with single and double rows of circle stones, and very perfect. The largest, on the summit of the elevation, had a treble row of stones round it, laid very regularly. The cairn was sixteen feet in diameter of the inner ring of stones, and, as I had remarked at Jiwargi and other places, the usual entrance stones at the SW. side were regularly placed, as also two stones NE. and SW., on the top of the tumulus. I had the large cairn on the summit of the knoll opened and examined. After digging a trench through loose stones and earth NE. and SW., in the direction of the top and entrance stones, beginning

from the SW. entrance, to a level with the surrounding ground, or probably three feet, the lower excavation was carefully commenced from the same side. About four feet from the surface of the ground two large stones, or rough or irregular slabs, similarly placed to those in the cairns at Jiwargi, were met with, lying in the same direction as the entrance stones, but sloping and directing downwards. Following these, and at a depth of ten feet from the surface of the ground, some remains of pottery and bones were met with, and the excavation was continued to the bottom and around very carefully. The floor of the cairn consisted of slabs of stones, and was about five feet broad, and six feet long. On these a number of earthen pots or jars had been placed, of much larger size than any found at Jiwargi. Some of these were broken; some were too firmly imbedded in the earth and gravel of the sides of the cairn to be got out whole; but seven were recovered perfectly entire, or only slightly chipped, with their contents. The whole of the interior of the cairn was cleared out, until the natural gravelly walls of the excavation alone remained, but no traces of iron weapons, utensils, or small cups and urns, as at Jiwargi, were found. All the vessels got out whole had covers: they are of sound glazed pottery, of the same bright red colour as is generally met with, and, though not unlike the ordinary ghuras or chattees used by natives, are yet of peculiar and more elegant forms, the bottoms being more pointed. These pots contained portions of partly calcined human bones, ashes, and pieces of charcoal, mixed with earth, as in the kistvaens of Hăggăritgi and Rajăn-Kolur. The sides of the excavation were of strong moorum or gravel; but the earth that had been filled in was soft, and without stones, and of the kind called "pandri mutti" by the natives, and must have been brought from some distance, as there is none anywhere near the spot. This earth had evidently been filled in after the urns had been deposited. It was impossible to ascertain how many had been originally deposited in the cairn, as so many broke on the earth being moved; but as well as I could estimate, there must have been at last from fifteen to twenty of various sizes, all having the same contents: those recovered were, however, the largest. I examined all the adjacent hills, in the hope of finding cromlechs or kistvaens, but without success, and I cannot hear of any other groups of cairns in this vicinity. I did not consider it necessary to open any more of the cairns, as it was evident that they belonged to the sect which burned their dead and buried their ashes only, without weapons, or smaller cups and utensils, and it is probable, I think, these cairns, which contain urns with ashes in them,

belong to the same sect as those which used kistvaens for the same purpose, wherever stones could be conveniently obtained for their erection.

It is possible, also, that the cairns and kistvaens were family sepulchres, in which, as each member died in succession, his ashes were collected and deposited in the cairn. At the same time, the labour of opening out the whole, from top to bottom, on each successive occasion of a death, would have been almost equal to the construction of a new cairn; and if this system had been followed, a greater mixture of gravel of the soil of the spot with the soft whitish earth placed about the urns might have taken place, which would have been observable now. It is more probable, I think, that the cairns may have belonged to the tribe collectively; that as members died their ashes were preserved by their families in urns, and when a sufficient number had accumulated in the tribe they were deposited in a cairn, and finally closed up. This hypothesis appears, perhaps, more reasonable than the other; and may account as well for the perfect condition of these urn-cairns as for the manner in which the light earth was first placed, then covered by gravel and moorum, and finally by stones and earth intermingled, to the top of the cairn, around which the double or single circles of large stones were placed.

REMAINS NEAR THE SHAHPUR HILLS.

These are of a very varied and interesting character, and it is necessary to describe them separately. The first met with, coming from Sorapûr on the Shahpur road, about nine miles from Sorapûr and three from Shahpur, is near the small village of Vaibăthălli, and lies immediately to the east of the high road, after passing the village in the direction of Shahpur. The road passes through a portion of it, so that the locality can easily be found. A plan of this curious spot is numbered 5, and attached.

I presume it to have been ground regularly marked out for a cemetery of cairns, and the labour bestowed upon it has been enormous. The ground has been marked out in parallel or diagonal lines, leaving a square of from eighteen to twenty-four feet between each four points, which would be enough for an ordinary cairn; the points of the squares and the lines being formed of large granite rocks, which have evidently been rolled down the neighbouring hills, and placed in the situations they now occupy—but at what expense of labour, and with what patience! These rocks are irregular in shape, and of various sizes; but the average of them is not less than six to

seven feet long, by three to four thick or high, and very many are at least half as large again. The sides of the square, as it very nearly is, gave twenty rocks west, by twenty south, which, if the whole were complete, would amount to four hundred rocks; but a portion on the north-east corner and north side has not been completed, or the rocks have been removed, and about fifty would be required to complete the whole. Those laid down in the plan are from actual survey measurement, and the vacant spaces are as they exist. The whole of the ground is usually cultivated, but the size of the rocks has defied any attempt, if ever made, to remove any of them. I assume that the squares marked out must have been for cairns, as there are five,—two with double rows of stones, and three with single,—near the centre of the field, as shown in the plan; they are all very perfect, and have not been disturbed. The tradition attached to the spot is, that a king had once his encampment there, and the pieces of rocks were laid down for his horses and elephants. The place, therefore, in Canarese and Hindustani, is known by the name of "The King's Stables."

North of this field is another piece of cultivated ground, in which there are twenty-eight cairns, large and small—one with a triple circle of stones, which forms a considerable tumulus, two others with double circles, and the rest single. In one place four of the cairns are surrounded by what appears to have been a low wall, but most of the stones have been taken away, and as several of the cairns have evidently been broken by the plough, and the circle stones disturbed, it is possible that in the lapse of time, and constant cultivation of the field, many others may have been disturbed. Enough, however, remain to render the spot in connection with the rocks very remarkable and interesting. I was not able to have any of these cairns examined, but shall not fail to open the principal one and examine it the next time I am encamped near the spot.

PLAN VI.

Is of a small group of cairns on a waste spot of ground below the tank of Amrawătti, on the lands of Vaibăthălli. There are five of them, one with a double circle of stones, the others with single. This group lies about a quarter of a mile W. or NW. of the preceding, and presents no particular features for remark.

PLAN VII.

Is of a rather remarkable barrow or tumulus, and cairns, in a field on the lands of *Rakhámgira*, through which the high road from Shahpur to Săggi passes, and about a mile north of the last

mentioned group. This tumulus has been formed with much care and labour, and though I tried to have a trench dug through it, in order to ascertain its contents, the ground was so hard, and the moorum and stones had united into so strong a mass of concrete, that I was obliged to abandon it at the time, and have not been able to resume it. One of the cairns on the mound has a triple circle of stones, two double circles, and one single, and the whole of the mound is evidently artificial, the field around it being perfectly level. Originally there was one or more rows of stones all round the base, but these for the most part have been disturbed and removed. I have seen no tumulus so marked in character as this, in the Sorapûr country, and on this account it merits more particular examination than I have been able to bestow upon it. In the same field are ten other cairns, eight in one group NW. of the large tumulus, and two by themselves SW. All these are insignificant in comparison with the others.

Not very far from the foregoing, perhaps a mile, and in the valley into which the road from Shahpur to Săggi turns, is a remarkably large insulated granite rock, near a small rivulet which feeds the Amrawătti tank. This rock is about twenty feet high, and eight to ten yards in diameter, of a round irregular form. When I first saw it, it was surrounded by a double ring of large stones, very regularly placed, with two larger rocks as entrance on the south side ; but the Wăddiwars employed in the repair of the tank have, I find, removed and displaced nearly all the circle stones. This rock, as I saw it first, had a very remarkable appearance, and impressed me with the belief that it must have been marked out as a place of worship or sacrifice. Captain Congreve, in his article before referred to, gives several instances of rocks on the Nilgherris as encircled by stones, and with which the one I mention exactly corresponded in all respects. I believe the same kind of Druidical remains is well known in Devonshire and in Cornwall, so that it is at least satisfactory to have found among the Sorapûr remains one striking corroboration of identity with those of the Nilgherris and Britain, even in this particular.

PLAN VIII.

This, as will be observed by the plan, is a smaller collection of rocks, in something the same plan as the larger one at Vaibăthălli. It is close to the hills, and upon the high road from Săggi to Shahpur, near a small tank, and about a quarter of a mile from the large barrow. The rocks have not been completed to form exact squares in all instances, and, with a few exceptions, are not generally so

large as those at Vaibăthălli. Among them are two cairns, but of no remarkable size or construction.

Again, about a mile further north, and close to the eastern gate of the town of Shahpur, there is another group of lines of rocks similar to those already mentioned, which has once been as large, or nearly so, as that at Vaibăthălli; but the rocks placed here were, perhaps, for the most part of smaller sizes, and many have been removed, or are at least wanting; so that the lines are only perfect where they were too large to be stirred. Part of the space is a cultivated field, part is occupied by the high road, and the remainder is on waste ground to the east. As the lines of rocks were so imperfect, I did not survey the place, which is remarkable only in connection with the two others already mentioned. It could not, however, be overlooked by any one acquainted with the characters of these antiquities, as the rocks which remain have a very peculiar appearance in the ploughed ground, apparently so regular, and where, except these, are no others of any description. I could not find traces of cairns among these rocks; if there were any originally, they have been long ago obliterated by the cultivation of the greater portion of the land in which they are, and which is of excellent quality.

PLAN IX.—TUMULUS AND ROCKS NORTH OF THE SHAHPUR HILLS.

I consider this as by far the most remarkable of the remains about Shahpur, if, indeed, it does not much exceed in interest even the cromlechs, in the enormous labour with which the outer lines of rocks have been placed as they are. I had no idea of its existence until one day when encamped at Shahpur, in June last year, and having to examine a well near a temple which required repair, I came upon the tumulus quite by accident, as I was riding across the fields. It transpired, however, that the place was well known to the people, who have a legend regarding it, which was told me by my companion, the Pujári of the temple, to this effect:—Once upon a time a party of Bedins had brought up a large spoil of cattle and goats from a neighbouring district, and on their return quarrelled about the division of the booty. As they happened at the time not to be far from the temple of Amlapur Hănămān, which is held very sacred among these people, and it was near day, they agreed to stop and ask the opinion of the god as to what they should do. The cattle, therefore, were collected in a group,—the bullocks and buffaloes outside, the cows and calves next, and the sheep and goats in the centre,—and all lay down to rest. When day dawned the thieves went to the temple,

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TUMULUS OF ROCKS SHAHPUR.
(south line).

which is hard by, and alone in the plain; and, having reminded the god of sundry offerings to him before they set out on their raid, to which and to his favour they were indebted for a successful foray, they stated that, try as they would, they could not bring themselves to a conclusion as to the disposal of the proceeds; and, though loth to trouble him, begged him to step down to where the cattle lay, and decide the quarrel, or it would end in all of them fighting among themselves and being slain, which would bring great discredit upon him. The god was willing to be arbitrator, got off his pedestal, and proceeded as he was to the place where the cattle stood, and, having selected some good cows and buffaloes for the Brahmins of the temple, proceeded to divide the rest according to his notions of justice. This, however, was by no means so easy as he supposed: he was accused by all the thieves of favoritism, and that because such a man had made a sacrifice on such a day, and another had not; a third had a vow to fulfil, and another had made none; he was evidently prepossessed in favour of his votaries, and could not be a judge at all—so the best way, as they had at first proposed, was to settle the quarrel by the sword, and whoever should be victorious in the end was to take all. Upon this the god fell into great wrath, declared his reputation would be ruined for ever if a parcel of roving Bedins came and fought in his holy precincts, under his very nose; and after (according to my informant) a liberal abuse of the female relatives of the party, declared not a beast should move. Gradually, then, and to the horror of the Bedins, the cattle sunk down motionless, and became stone. The Pujári, when he had got thus far in his story, triumphantly exclaimed—"There! you see the truth of the story verified; for see, the sheep are all black, and the other cattle grey, and of all colours, stricken as they lay!" I ventured to remark that some of the rocks were very tall for cows and buffaloes. "Ah," said he, "that's true; but you forget that men were giants in those days, and so their cattle were large too; we are pigmies now in comparison;"—and as he seemed quite satisfied with his own conclusions, it was no use to gainsay them. The stones are therefore considered as a proof of the miraculous power of the Amlapur Hanaman, though the Bedins hint that it was a spiteful trick of the god to turn so many good beasts into stone for such a trifle as a few lives.

It was at once, however, very evident what the stones were, and a very striking appearance have they in the wide plain when the ground is clear of crops. A long and correctly formed parallelogram of 400 feet by 260, composed of huge masses of granite, encloses a smaller

figure of smaller rocks, and these a tumulus rising about ten feet above the surrounding ground. The circle of stones at the summit was of superior diameter to any I had seen: the sides of the tumulus were covered with large black rocks of greenstone, and these surrounded on three sides by a double row, and to the east by six rows of granite rock, partly incomplete, and of smaller size. The tumulus measured sixty feet in diameter between the circle of stones on the summit, which was bare and level; the slope southwards and eastwards from the west, as the ground has a natural inclination to the south, was sixty feet; and that on the north and west, where the ground rose, was forty feet. On the slopes of the SW. and NE. corners were two other smaller circles of black stones, of smaller diameter; and the rest of the greenstone rocks had been placed, apparently without regular design, so as to cover the whole of the slopes on all sides, the parallelogram enclosed by them being 190 feet north and south, by 160 feet east and west. The exact number of these black rocks it was impossible to ascertain correctly, as also the positions of all; and after several attempts to have them corrected, and to lay them down correctly, I was obliged, for want of time, to give the matter up, and to judge as far as possible by my eyes, counting and measuring the outside lines, and counting and filling up the rest by portions as they appeared to lie. The inner lines of granite rocks, and those of the main outer line of the parallelogram, were carefully counted and measured, and laid down in the plan by observation, in their proper positions, and with reference to the scale of forty feet to an inch. I extract from my field-book the measurements of some of the largest rocks of the outside lines. It would be tedious and unnecessary, perhaps, to give the whole:—

	Length.		Breadth.		Height.		Girth.	
	ft.	in.	ft.	in.	ft.	in.	ft.	in.
Rock..	10	5	7	4	5	1	26	9
,, ...	9	0	8	0	4	3	24	6
,, ...	10	1	9	7	5	2	27	9
,, ...	7	2	4	3	4	0	24	3
,, ...	8	6	8	2	6	8	26	3
,, ...	9	0	5	6	7	3	25	6
,, ...	9	0	4	3	8	9	21	0
,, ...	7	6	8	1	3	8½	24	9
,, ...	9	0	7	6	5	0	20	9
,, ...	9	5	8	4	5	8	27	2

The weight of each might be computed, but I have not attempted it. The rest are but little short of these dimensions, varying from 8 feet

4 inches long, 6 feet broad, and 4 feet high, to 6 feet long, 5½ feet broad, and 3 feet 9 inches high, which is the smallest of any. How these rocks were moved, and placed as they are, so regularly, it is impossible to conceive. The nearest granite rocks are those on the hills of the Shahpur range, which, opposite to the tumulus, is quite a mile and a half distant, and there are no others anywhere in the plains for miles around. The geological character, indeed, of the country, changes after leaving the hills, and the limestone formation commences. I can, therefore, come to no conclusion but that the rocks, which are identical in character with those of the Shahpur range, were rolled down from them into the plain, and from thence rolled, or otherwise conveyed onwards to their destination. The removal of one of these masses of granite would be an almost impossible undertaking with the means at present obtainable in the country; and yet there are fifty-six placed here, all of which have been brought from the hills across two nullas, one of which has rather steep banks, at least fifteen feet deep, of soft earth—a serious obstacle. Great as has been the labour to transport and erect the slabs of sandstone and limestone of which the cromlechs and kistvaens of Rajān-Kolur and Haggāritgi are constructed, the means employed there sink into insignificance when compared with the transport of these great rocks. How many men were employed in the undertaking—how much time—what mechanical or other means—it is impossible to conjecture; but they stand, monuments of the faith of bygone ages, alike immoveable and imperishable. Sketches Nos. 4, 5 and 6 will give, perhaps, a better idea of them than any description. No. 6 shows the south side, and No. 5 the east, in which the largest rocks are situated, and are as correct as to shape and situation as I could make them. The greenstone rocks in the slope of the tumulus are no less worthy of remark, and their great weight for their size, and the distance from which they have been brought, evince the patience and perseverance of the people who transported them. Generally speaking, these are from four to six feet long, and from two to three feet broad and high, mostly of an irregular round figure. The nearest bed or dyke of greenstone rocks among the granite hills is about five miles from the tumulus, to the SW., and these rocks must, therefore, have been brought from thence, either upon carts, or rolled or carried by men. The former supposition is, perhaps, the most probable, as these people may have had rude cars, such as are now used by the Wāddiwars or stone-workers of the country; many of the rocks are, however, too large to be transported by these means.

Having completed my survey, I proceeded to ascertain the contents of the tumulus, and directed two trenches to be cut through the mound, one north and south, A to B, the other east and west, C to D. These trenches were six feet wide, and were begun from the natural ground, so that the contents of the mound would, I trusted, fully appear. Nothing, however, was found in the shape of the remains of urns, weapons, or cists, as in others. A few pieces of broken pottery were found now and then, but nothing worth preserving. Where the trenches crossed each other the excavation was continued to some depth, but without success, the moorum being hard and compact, and had evidently never been disturbed. The trenches ultimately gave sufficient clue to the object and construction of the tumulus; for layer after layer of ashes, partially burnt bones, and bits of charcoal, and earth and sand burned or run into slag, as it were by the action of fire, proved that successive cremations had taken place in great numbers, down to the floor of the ground. It was evident that as a body was burned, the spot had been covered over with soft greyish earth,—pandri mutti,—and the tumulus had risen by a succession of these layers, which were in some places five and six in number, all of the same character.

It is possible, therefore, that this spot was the place where all the dead of the tribe were burned; that their ashes were collected in part, and removed to be buried in cairns, as at Chikanhalli; and that when the tribe migrated the tumulus was completed, and finally sealed and secured by its circle of stones on the slopes as I have described; or it may have been, that on the death of a great chief many persons were sacrificed, their bodies burned, and the tumulus constructed at once. The great number of indications of one body having been burned on each spot, and the successive layers of fresh earth and ashes, with burned earth and slag, incline me more to the former supposition than the latter; and, as far as I could ascertain from the trenches, which laid bare the whole of the interior by sections of nine feet deep at the crest of the mound, and six broad, there seemed to be no portion of it, including the slopes, which were free from the indications I have already noticed. It is evident, not only from the labour bestowed upon the tumulus, but from the remains at Vaibathalli, Rakhangira, and Shahpur, all on the east side of the hills, as well as those on the north, that there must have been a large encampment or settlement of these people about Shahpur. I have looked in vain, however, for any traces of ancient walls, or indications of habitations, if I may except one doubtful spot, not far from the rock which had circles of stones round it, and

which shows some traces of old walls, as well as small pieces of red glazed pottery. The Shahpur range is a mass of granite, 700 to 1,000 feet high above the plain, intersected by deep ravines, and very rocky. I thought it probable, perhaps, that cairns or cromlechs might be found on the summit plateau, which is some miles in extent; but the parties I sent could find nothing, and I was not able to examine the hills myself. I am not aware that there are any other remains in the vicinity of Shahpur but those I have described.

PLAN X.—ROCKS AND CAIRNS AT IJERI.

A group of trap rocks, which have been placed in the same manner, and apparently with the same intention, as those near Shahpur, lies upon a rising ground about a mile west of the village of Ijéri, of the Nellugi talook. A few rocks are wanting to complete the squares, but the arrangement is obviously regular, and some of the rocks are of large size,—eight to ten feet long, four to six feet broad, and three to four feet thick,—and, from the nature of the stone, very heavy. The rocks have been brought a mile and a half or two miles, from the ravines to the north or west. There are two cairns among this group, each occupying the area of a square, but they did not appear of sufficient consequence to have opened. South-west of the same village, about half a mile on the road to Balbatti, there are three other cairns, one of large size, of which the circle of stones is double; the other two are of smaller dimensions, and have only single circles. The village of Ijéri is situated about eighteen miles to the NW. of Shahpur. I have not been able to discover any of these or other Druidic antiquities in the intermediate line of villages, nor in any of those immediately around it; but it is evident that there was an encampment here, and, as the ravines abound with grass and water, large herds of cattle would have found ample sustenance.

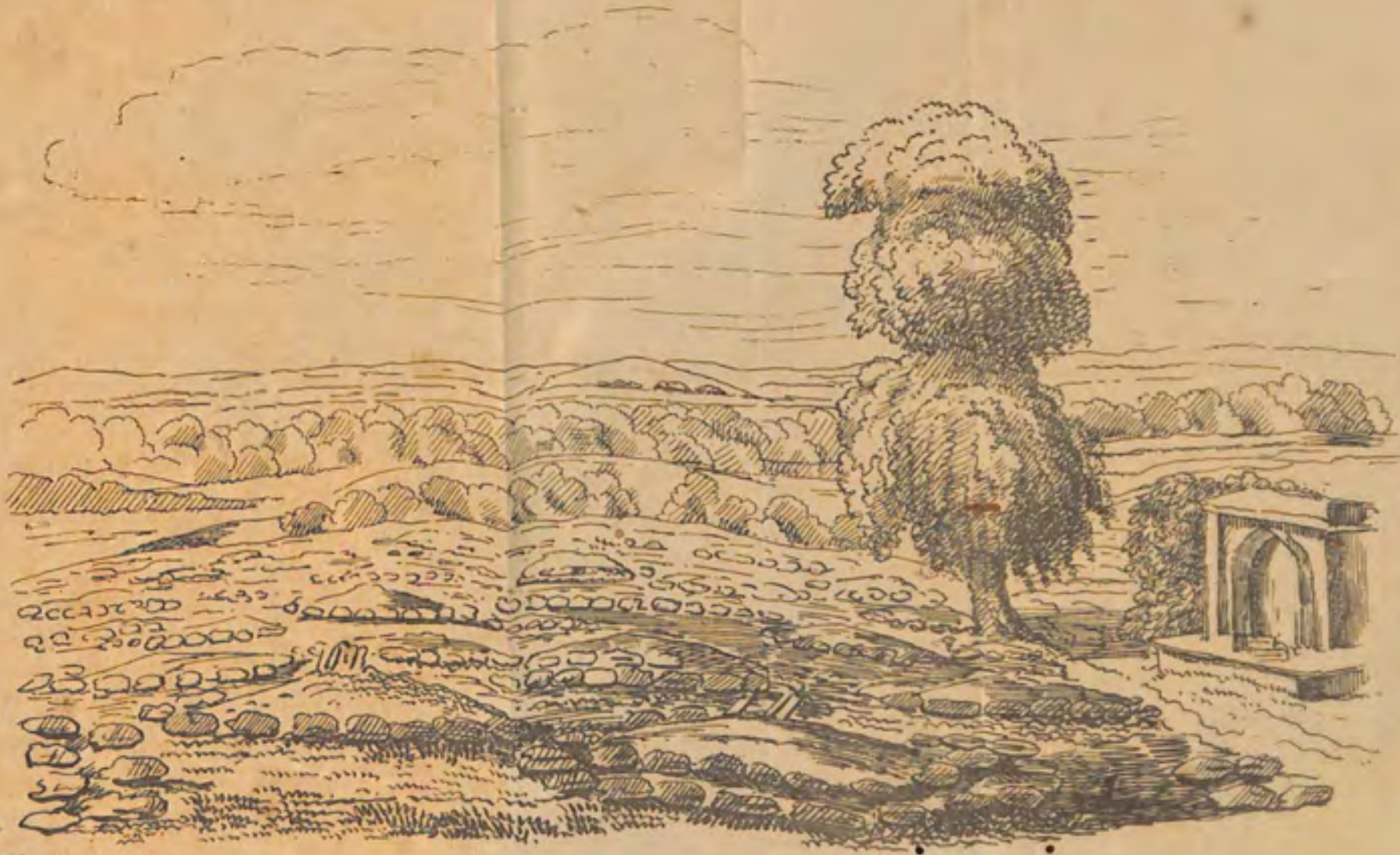
PLAN XI.—CAIRNS AT MANDEWALLI.

This village belongs to the same talook as the preceding, and is situated about the centre of it, about twelve miles NW. from Ijéri. In the month of February of the present year, as I was travelling from Almella, in the British territory, to Ijéri, I passed these remarkable remains, which are situated about a mile NW. of Mandewalli, on the Veritgi road, on a rising ground of hard moorum and rock, covered with large trap rocks. Among these the four principal platforms are very distinct, and have been constructed with immense labour and patience. They consist of double and treble rows of large rocks, joining each

other, surrounded by a square of rocks of similar size, the interval being filled up with smaller rocks, placed so as to touch each other in most instances, and forming a complete and almost impenetrable covering to the ground beneath, which rises to the apex of the cairn, where from four to six rocks have been placed together as a seal to the whole. Part of the largest cairn is incomplete, the cultivation having gradually encroached upon it, and the rocks being scattered about. Between the three large platforms and the single one to the north there are two small cairns, no way remarkable, and to the right of the road to Mandewalli six other cairns in a group, on an open gravelly spot. These present no particular features for remark, and seem in every respect the same as those noticed in other places. I did not halt at Mándewalli, but as soon as possible sent a party of men with a Karkoon to open one of these remarkable cairns; but they returned in a few days, saying that it was impossible to remove the masses of rock, which, one over the other, were tightly jammed together. A few pieces of pottery were found, broken urns, which showed the platforms to be true cairns; but whether pertaining to a tribe which buried or burned its dead, complete investigation could alone determine. It is probable that other cairns may be found on the lands of this village, and in the purgunna, particularly on the slopes of, and among the grassy ravines which descend from the high land about Ijéri and other villages on the plateau, and I purpose, if possible, to renew my examination this year.

PLAN XII.—CAIRNS AT JIWARGI.

I now return to the village, the remains at which were the subject of my first communication to the Society. The plan sent will give an exact idea of the situation of the cairns, and their number, the whole having been carefully surveyed by me, and Sketch No. 7 of the general appearance of the ground. There are 268 cairns in all, small and large: the plan distinguishes those which have single and double rows of stones round them, as well as those which I have opened, and those which, composed of slabs of limestone placed parallel to each other, are, as it were, square or oblong open cists, and in which, except a few potsherds, every remnant of former deposit seems to have disappeared. To the south of the cairns, near the bank of the Jiwargi nulla, are the evident remains of a small village; foundations of walls built of stones and mud; heaps of mounds; and in every direction portions, small and large, of the same red glazed pottery as is dug out of the cairns, are lying about, as also in a field adjoining,



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CAIRNS AT JIWARGI.

where they are turned up by the plough. I cannot, therefore, refuse to consider that this may have been the Scythic village whose inhabitants were, perhaps, with others from surrounding camps, buried in the cairns ; without, indeed, it was merely the place where pottery was made, and which may have required roofed houses for drying and manufacture. It would be desirable to have trenches dug through some of the ruined mounds ; and should I visit Jiwargi this year, I will endeavour to have this done.

In April and May I was so severely indisposed that I could not effect so much as I wished in the way of examination of cairns ; but in all four large ones were opened, and several smaller cists, square and oblong, and I proceed to detail what appears most remarkable in the examination.

In one of the large cairns there were two regular cists, or stone coffins, one of which, on the east side, contained one skeleton, the other, on the west side, two, of which *one skull only* was in the cist. The whole of these skeletons were perfect enough to have shown the missing skull if it had been placed anywhere in the cist, or had been on the body ; and one of the two skeletons in the west cist had a head ; the other had two of the neck vertebræ attached to the spine, which may favour the supposition that the body—apparently that of a woman, from the smallness of the bones—had been beheaded. Above the cist, and met with as the excavation continued from above, were distinct remains of four other bodies and skulls, with smaller bones, and portions of a few skulls of children. The remains of the bodies were by no means regularly disposed ; indeed, from the positions of the bones, they seemed to have been pitched into the grave at random, one over another. None of the skulls were found attached to the bodies, or in the places they ought to have occupied in the earth if the bodies had been interred whole, but were found confusedly here and there, without any reference to the skeletons. This cairn contained comparatively few urns or pots, and no remnants of weapons could be found, beyond a few undistinguishable portions of iron, completely corroded. The most perfect skeleton in the cist to the east was five feet two inches long, and was that of a male adult ; the others did not appear to me to be as much as five feet, but they were so confused that I could not make any satisfactory measurements.

The other large cairn, which indeed is a considerable tumulus, near the centre of the group, was of the usual depth,—that is eleven feet from the crest of the mound,—and contained a large cist four feet ten inches long inside, by three feet broad, and was formed into two divisions by a

slab of limestone, lengthways ; the divisions being, respectively, to the east two feet broad, and to the west one foot. There were two skeletons in the larger portion of the cist, laid over each other, the upper one *face downwards*, the other and lower one on its side, the heads of which were properly attached to the spine ; but on the top of these heads, and so discovered before the bodies below, a skull was placed *upright* in the middle by itself, with vertebræ attached it. This skull was nearly whole when got out, but the dry hot winds caused it to crumble away almost entirely in the course of the day, which I much regretted. The cover of this cist was nearly perfect, only one slab, towards the feet of the skeletons, having fallen in, so that it is impossible that any skull could have fallen down through the earth to the bodies below. In the cist, therefore, were two skeletons, placed as I have described, with an *extra skull*, evidently placed where it was found after the bodies had been deposited. The portion of the cist one foot broad contained urns and pots filled with earth only, some of which—the small ones inside larger ones—were very perfect. Of the large ones none came out entire, and the remains of an iron knife and a spear-head were among the urns, some of which, with the spear-head, were sent to the Society.

Now the excavation had been most carefully carried down in my presence after the first bones were met with, for I wished much to have further proof that persons had been beheaded and interred—in other words that human sacrifices had been made. From time to time bones were met with, but very irregularly, and much decayed. Two skulls were found, but not with other bones, nor with spinal vertebræ. It was impossible to judge exactly how many bodies were interred there, but I should think five or six adults, independent of those in the cist that I have now to make more particular mention of. The whole of the upper earth had been taken up as far as the covering slabs of the cist, and thrown out of the grave, except a portion over the head of the cist. On breaking into this, bones were found, and the earth then carefully picked away from them. Tracing and exposing them, the result was the disclosure of a skeleton lying transversely, that is east and west, on the lid of cist, and lying upon it. The body was headless ; but after a little more search the skull, at the time nearly perfect, was found, as it had evidently been placed, in the centre of the body, and resting upon the pelvic bones. The skull was upright, and looked to the south. It was so entire that I wished to take it to my tent to draw it at leisure, but on attempting very gently to remove it, it fell to pieces in my hands.

I was too ill when the other two cairns were opened to examine their contents as I had done these, but my people, now accustomed to observe, told me that on the floor of one cairn (it had no cist) there were three skeletons, lying north and south, and four skulls, and that bones had been met with confusedly, as the digging descended, with portions of skulls; and that there were only a few pots, none of which came out whole. In the other, also without a cist, there was only one skeleton on the floor of the grave, with a few pots to the west of it, at the usual depth; and that very few bones, and only one skull, had been met with as the excavation proceeded.

I have before stated that none of the open cists yielded anything, though one was exceedingly promising in appearance. It was composed of four large slabs of limestone let into the earth to within a foot of the surface; in fact, not unlike a large cromlech or kistvaen, let down till nearly covered, but without a top. The sides were eight feet six inches long by five feet eight inches broad; the ends five feet broad by five feet six inches high. The interior contained nothing whatever that could be distinguished, beyond a few broken potsherds, and some much decayed pieces of bone. None of the smaller cists, of which several were examined, yielded anything. In all these cairns precisely the same method of construction as described in my last communication was found to exist; 1*st*, the circle of stones; 2*nd*, the tumulus within them, composed of loose stones and earth; 3*rd*, the entrance stones, laid NE. and SW. Then, on digging down from the entrance stones, the two other large slabs were found, leading to the foot of the cist; next, the cist, at a depth of from eleven to fourteen feet from the surface, and eight to ten feet from the bottom of the upper entrance stones, the body of the grave being filled with fine earth, without stones. No one passing from the Bhima at Ferozabad to Jiwărgi by the high road can possibly miss this interesting group of remains; and it is well worth the while of any traveller to turn aside from the road to examine the spot. It is easily found by an old Mahomedan tomb and a single tree by which the road passes, and on the left of the road as you go to Jiwărgi, and opposite to the tomb, are black trap circles of large stones, which are the cairns.

PLAN XIII.—CAIRNS ON THE LANDS OF ANDOLA.

I had discovered this group of cairns the year before, but had not been able to examine any of them. They occupy a small elevation immediately to the right of the road leading from Chărmur to Andôla, about half way distant, or a mile and a half from each village.

They are about five miles SE. of the Jiwărgi cemetery. The elevation they are upon is waste, and is composed of limestone shale, harder than that at Jiwărgi, slightly covered with dark coloured earth. In all there are forty cairns and cists distinguishable, but the villagers informed me that the ground had been formerly cultivated in parts, and it is probable some of the smaller cairns may have been obliterated, especially on the ground to the W. and NW., which is softer, and the soil deeper than that on the crest of the ridge. In appearance these cairns are precisely the same as those at Jiwărgi, the circles of stones, double and single, being carefully placed, with the entrance stones in several above the ground: one cist, of slabs of limestone let into the earth, is eight feet long by four wide; the rest are smaller, and appear to be graves of children. I had two of these cairns opened with considerable labour and trouble, for the surface stones and portions of shale had become so hard, that it was with great difficulty that the workmen could break through them with the pickaxe. Those selected were the largest of the main group on the summit of the ridge, and were eighteen feet in diameter inside the circles of stones, had large entrance stones, and were in every respect complete and undisturbed. I give in Plan xiv. sections of both of these graves.

No. 1 was the first opened at the entrance stones. As the excavation proceeded, a great quantity of bones, large and small, were found in the softer earth below the upper concrete, and several portions of skulls. I was present at part of this examination, and nothing could have been more confused than the appearance of the bones lying in all possible directions. For the most part they were harder, and in better preservation than the bones usually found, but very brittle; and as there was no apparent guide from their positions to the positions of the skeletons, there were none found as perfect as I could have wished. I observed, however, here, as at Jiwărgi, that there was no apparent relation of the skulls when found to the bones of the skeletons, except in one instance, where the bones led to the position of the skull, and the body had evidently been laid down in the proper line of the cist: this was immediately over the cist, and resting upon it. Above this, some skulls were found towards the foot of the grave, to the SW., others in the opposite direction, among the earth; but with the exception of the one I have mentioned above, *not one* in connection with the skeleton bones. Remains of eight skulls were found in this portion of the grave. The cist of this cairn was very perfect, and lay ENE. and WSW. by compass, and was made of slabs of limestone, five placed transversely as a floor, neatly joined with single slabs for sides 5 feet

6 inches long, and 1 foot 9 inches high. The slabs are 2 inches thick. The head and foot slabs were 6 feet long by 1 foot 9 inches high, and the whole was divided into two equal portions or cists 3 feet wide. The covering slabs were all perfect, except one at the foot, which had broken and fallen in. On removing these the cists were found to contain two skeletons each, those to the east being of a larger size than any I had yet seen, and fully filling the cist: they had been laid as nearly as possible one over another, and were apparently perfect. Those on the west side were smaller and more decayed, but the skulls were in their proper places: from the smallness of the bones I supposed them to be of women. Again, to the west of the cist, and between it and the natural wall or side of the grave, were many remains of human bones, for the most part small and delicate, apparently those of children, with several remains of their skulls; but it was impossible, from the decay of all, to trace the skulls to the skeletons. A few pots were found at the head and on the west side of the cist, large and small, and some perfect, but in nowise different from those of the Jiwărgi cairns, either in shape or colour.

Cairn No. 2 (vide plan) was eighteen feet broad inside the circle. The excavation proceeded as in the one preceding, but an attack of fever prevented my seeing it. My people, however, reported it to be exactly similar to the preceding one; that bones were found lying in all directions, some transversely, some diagonally, and some direct, with portions of skulls here and there confusedly. The remains of five skulls, with portions of leg, thigh, and arm bones, and some vertebræ, were brought to me, but all broken in removal.

I had directed the cist to be reserved for my own inspection, and as soon as I could, went to see it. I found it entirely perfect, none of the cover having fallen in. On removing the upper slabs, the cist appeared divided into two portions; the one to the east being 5 feet 6 inches long, by 2 feet 2 inches broad. The other to the west was 1 foot 2 inches broad by 5 feet 6 inches long, and there were slabs for the floor. In the eastern, or larger cist, was one skeleton only, which was very distinctly traceable from the feet upwards, the smaller bones being distinguishable, though they crumbled immediately, as also the pelvic bones and vertebræ. I trusted, therefore, to find the skull at least perfect, and attached to the skeleton, but to my surprise, on reaching it, I found it separate from the body, and lying with the face to the NE. corner of the cist, and the top of the cranium to the SW. part of the skull rested upon the bone and shoulder of the left arm. It is not very possible that the head could

have got into the position it was by the body having been interred upon its belly, which I have found the case in some instances, though not many, as then the jaws would have been towards the body ; whereas the whole was entirely reversed, and must have been placed separate from the body. The plan of the cist (No. 17) gives the exact position of the head as it lay, and Sketch No. 8 its size and shape, traced without removing it. The measurements round the head were as follows :—

From feet of skeleton to SW. side of skull or top of cranium.	3	feet	6 in.
From head stone inside to NE. side of jaws and neck.....	1	,,	7 ,,
From face to west side of cist or middle slab.....	1	,,	1 ,,
From back of skull to east slab.....	0	,,	5 ,,

Some urns and pots were found, as usual, upon the west side of the cist, most of which were broken in removal, and a few pieces of iron much decayed. On a small shelf, however, of the side of the cairn, in a hollow which had been made for it, an urn in perfect preservation was found, which contained no earth, and only some light dust, with some bones, very white and delicate, which I conjectured to be those of a mungoose. These, with other bones, were sent by me to Dr. Carter, the Secretary of the Society, with some specimens of pottery found in the cairns. He informed me, in acknowledgment of the several articles, that the small bones were those of a guana, and that a portion of the jawbone of a canine animal, probably a dog, had been found with the other bones. This was the only instance in which I had met with such remains, and the pot or urn in which they had been placed had evidently been put aside with care. I had purposed to open another of these cairns,—that on the crest of the rise near the small nulla, which is perfect, and had double rows of circle stones,—but I was obliged to leave Jiwărgi from continued illness, and the work was not commenced.

Enough, however, in relation to my former communication, has, perhaps, been stated, to show the contents and construction of these very ancient graves, and to establish their identity with other Celtic-Scythian graves and cairns elsewhere examined in India, as well as in Europe. Nor can there, I think, be any room to doubt that human sacrifices, as I ventured to suggest in my last paper, in reference to the position of the skull, which was then described as found by itself among the urns at the head of a cist, took place to a considerable extent when a body or bodies were buried. The positions of skeletons without heads, lying in all directions, as if confusedly flung into the graves ; the positions of skulls found without reference to skeletons ; the very remarkable instances in the Jiwărgi cairns of a skull being found inside a perfect cist placed upright between those

of two skeletons; and of a skeleton being found lying transversely across the cover of the cist without a skull, the skull itself having been placed upright, and upon the middle or pelvic bones, with the face to the south—all serve to impress me with the conviction that the bodies so found were those of human victims. Whether the skeletons decapitated were those of women or men, I regret I have not sufficient anatomical knowledge to determine. Captain Congreve, in his most valuable article, quoting from Herodotus in Melpomene, recounting the funeral of a Scythian king, states that "after the body has been transported through the various provinces of the kingdom, it is placed on a couch set round by spears. His concubines are then sacrificed, and a mound of earth is raised over the king and his women."* Other works upon this subject might probably afford details of Scythic or Celto-Druidic customs in this respect, and of human sacrifices, probably of both men and women, slaves, captives, and concubines; but I regret I have none to refer to. Captain Congreve mentions, however, the sacrifice of children by the Scythians, and Thautawars of the Nilgherris; and in these cairns the bones of children are found with the others interred in the graves, while in some they have been burned and placed in urns. May we suppose, therefore, that children, as well as men and women, were sacrificed in funeral ceremonies?

In respect of the funeral urns or pottery, the forms of those which I have recovered here are simpler, probably from their greater antiquity, than those found on the Nilgherris, and are generally or for the most part without ornament. The material appears to be the same. I have no work to refer to by me in which I could compare the shapes of the urns and cups found here with those of Europe; but I see that they are in some instances identical with several given in a description of the "Kodey Kulls or Pandoo Koolies," at Chataperambah, on the Beypoor river, in Malabar, by J. Babington, Esq., (*Transactions of the Literary Society of Bombay*, vol. iii. 1820;) and that the iron instruments—an iron tripod, a spoon lamp, spear-heads, &c. are also identical with others found here in cairns, not of precisely the same construction, but agreeing in general principles.

At the village of Kolur, of the Andôla talook, about four miles due north of Jiwărgi, there are the remains of six large cairns on an elevation near the bank of the river Bhima, which are surrounded by single and double circles of trap rocks, like those at Jiwărgi. They are in one line north and south, at the interval of a few yards from each

* Vide extract from Rollin's Ancient History at conclusion.

other, and, being of the same construction, present no particular features for remark. I was not able to have any of these opened. These are the last cairns I had found to the northwards, and though I had made repeated inquiries from the native authorities of the Gulburgah district, I have not been able to discover any Scythic remains north of the Bhima in this direction.

CHAPTER II.

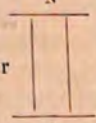
Having detailed all the remains I have as yet found in the Sorapûr district, I now pass to notices of such remains in other districts, which have been kindly supplied to me by friends who have observed them. The first are from the letters of the Revd. G. Keis, German Missionary at Bettigherri, in the Dharwar Collectorate, to whom I showed some of the Sorapûr remains, cromlechs as well as cairns, and who thus became familiar with their appearance.

PLAN XIV.—CROMLECHS, &C. NEAR KOSGI.

The town of Kosgi is situated about nine miles south of the Tungbhuddra, and eighteen miles north of Adwani, in the Bellary Collectorate. The cromlechs lie in a corner formed by three hills, joining each other about one mile south of the town. Nos. 1 and 2 are closed erections (kistvaen); No. 1 has a circular opening in the southern slab, as also has No. 2. The dimensions of the interior are in both instances 6 feet high, 5 feet long, and 4 to 4½ feet broad. Both erections stand on the solid rock, without any covering of earth upon them. No. 2 has a pavement slab, 4½ feet long and 3½ feet broad, so that an empty space of 6 inches broad remains on the eastern and northern sides, filled up with fragments of stone and rubbish. This I searched all through, but could find nothing, except small fragments of red and black pottery, a small piece of kindled wood, and a piece of bone, apparently of the skull of an animal, and not burned. No. 3 opens to the south, is of somewhat larger dimensions, and stands also on the solid naked rock. I searched in vain for anything in it.

No. 4 is a smaller erection, more than half buried in the earth. Its dimensions within are 3 feet from north to south, 3½ feet broad from west to east, and 4 feet high. The southern slab is not pressed by the side slabs, nor by the covering slab, so that it could easily be taken out if the earth were removed. The inner space was filled up with

earth, of which the upper third, that is so much as is above the ground surrounding the erection, seems to have been filled up by ants. I could not see any remains of pottery, or indeed of anything whatever. There are a number of similar erections round No. 4. Some of them have still the covering slab on them, and others not. As a characteristic distinction of these erections it appeared to me that the side-slabs are much thinner than those of Numbers 1, 2, 3, 4, and 5; that two-thirds of them are buried in the ground, but they always present

the form and never 

; and that their greatest dimensions are not from one cross-slab to the other, as in Nos. 1, 2, 3, but from one side-slab to the other.

No. 5 are remains of erections similar to Nos. 1, 2, 3, tumbled to pieces. It does not appear to me that any of them ever contained anything. No. 6 are segments of single and double circular rows of stones, of which the uppermost parts appear above the ground. It seemed to me as if the different segments were not the fragments of one large circle, but of several smaller ones. The space within these circles, and around and along No. 4, and the fragments about it, is the only spot where the solid rock has a covering of earth, which in the middle may be 5 to 6 feet in thickness.

The hypothesis which suggested itself to me in consideration of the actual observation on the spot was, that Nos. 1, 2, 3, and 5, were small houses of a nomadic tribe, whilst Nos. 4 and 6 were their burying-places—No. 4, one-third above the ground, because it was not deep enough, and No. 6, in the midst of those circles of tombs similar to No. 4, all covered with earth where it was deep enough.

PLAN XV.—CROMLECHS NEAR YEMMI GUDA.

From Hămpi, (Beejanugger) I crossed the Tungbhuddra opposite Anagundi, from which place I went in the direction of Yemmi Guda (the hill of the buffaloes), and arrived that evening at Mallapur, about four miles north, or rather NNW. from Anagundi. I asked the Patel for the "dwarf houses" at or near Yemmi Guda: he told me that there was a whole village of them on the top of a high hill just midway between Mallapur and Yemmi Guda, that is about four miles north of Mallapur, and four to five miles SE. from Yemmi Guda; and that he had heard of dwarf houses in the immediate

neighbourhood of the latter place, while the dwarf houses were known to all the neighbouring villages. So I concluded this to be the settlement of which you were told by the Kanacgiri man. Next morning I went with the Patel and some other persons, and, after a good deal of strolling about, we succeeded in finding the dwarf village, and I refer you to the sketch and description.

Near Mallapur itself, on the side of the valley, is another settlement. The remains of some twenty to thirty erections and graves are to be seen, but none of them preserved wholly. Of a third settlement, with a number of erections still standing, I heard, on the right bank of the Tungbhuddra, about five miles SW. from Anagundi. I have now not the least doubt, that if properly searched, such settlements would be found scattered here and there over the whole of the Deccan and Southern India in all the hilly parts; and equally certain it appears to me, after having seen the settlements at Kosgi and Yemmi Guda, that the large erections, open and closed, were houses, and not tombs; but that the tombs are separate from them, and differ in size and structure from the houses. I only beg you to re-examine the settlement at Rajăn-Kolur after you have read this, in order to find out whether, on closer examination, it does not agree with my observations and hypothesis.

Altogether in this place, including those that are still standing, and those that are fallen, the remains may amount to nearly a hundred, and they lie about in the utmost irregularity between the granite rocks. The direction from north to south predominates, but there are erections in every direction, as the plan shows, the most part of which was sketched from actual observation. The circular opening in the middle of one of the slabs is irregular, and its corners in some of them are as irregularly situated as possible. Preference seems to have been given to no particular quarter of the heavens, as the plan shows, in which the dot indicates the form and direction of the opening, taken by actual observation. The dimensions of the erections differ considerably: Nos. 1, 2, and 3 were measured. Of No. 1, the side-slabs are 9 feet long, and 6 feet 5 inches high, and the cross-slab 7 feet broad by 9 feet long. No. 2 is also an open house, almost of the same size. No. 3 is a closed one 8 feet 5 inches long, 8 feet 5 inches high, and 6 feet 5 inches broad. No. 1, as well as many other erections, closed and open, has a circular wall round it 2½ feet high, 4 feet broad, and 5 feet distant from the corners of the erection. All closed erections have a slab for the pavement or floor, and all are erected on the naked solid rock. In none of them could I find any remains, as of pottery, &c.

THE BURYING-GROUND.

On it I measured Nos. 1, 2, 3, 4, and 5. No. 1 is a triple tomb, 7 feet long within, and each space between the slabs 3 feet broad, exactly corresponding with the size of a full-grown body, with some inches left all around. No. 2 measures within 5 feet 5 inches long, and each of the spaces 2 feet broad. No. 3 is evidently the tomb of a child, 3 feet long, and 1 foot broad. No. 4 a double tomb, 6 feet 5 inches long, and 2 feet broad each. No. 5 a double tomb, 7 feet long, and 2 feet broad. Both spaces are covered by one large slab. On No. 1 are two separate slabs. I saw no circular sepulchral cairns like those in the Sorapûr country.

The whole settlement lies on the top of a granite hill about 500 to 600 feet high, and is situated on a kind of saddle between two heights. Granite blocks and large fragments lie scattered abroad over the whole of the settlement. The houses lie on a gentle slope, on the southern or south-eastern side of which a small tank is to be seen, that is a collection of water in a natural hollow of the rock. To the north of the place below the slope, on a level spot covered with sandy soil, and overgrown with grass and bushes, lies what I consider to be the burying-place.

The Yemmi Guda cromlechs are all of granite. The solid rock is of such a structure that the uppermost strata may be easily lifted up by a lever. In one instance I discovered a line of little holes made in the rock by a small chisel, just in the same way as the Waddiwars do at the present day, only that the instrument was much smaller than those now used by them. This was the only trace of instruments I could discover. It is not improbable that these tribes may have used fire for the purpose of raising the necessary granite slabs, and for the erection of them they had certainly some simple mechanical apparatus. Mr. Leonberger told me of a case in which one of his relatives in a village near Stuttgardt, in Wurtemberg, discovered a similar stone grave about ten feet below the surface on a small hill. Mr. Leonberger's description of it corresponds as nearly as possible with your description of those tombs at Jiwărgi : the skulls also seem to have been distinguished by the same peculiarities ; for the villagers talked for many years of the enormous and curiously-shaped teeth they found in that grave. Beside the skeleton of a full-grown person, there were two *smaller ones* buried in it.

I have forgotten to state two observations, viz. that on the SE. corner of this cromlech settlement the tank naturally formed in the solid granite rock has the appearance of a well, and is from six to

eight feet deep. I mention this because it is striking that all the settlements have water near to them, which seems to me in favour of the theory that the large erections above the ground had been used as habitations, and not as tombs, or depositories of urns with human ashes, for which no doubt the lower and half-buried erections were used. The second point which I forgot to state is, that in some parts of the path by which we descended from the hill through the jungle on the southern side towards Mallapur, there were rows of flat stones to be seen laid down in the water-courses, so as to form an ascending path over them up to the settlement. I have no doubt that the occupiers of the settlement laid down these stones, for no other persons could have had any interest to do so in the midst of these jungles. As there is another small settlement down in the valley on the SW. side of Mallapur, it appears that the path between the two places was much frequented, which circumstance would again favour my theory that the large erections on the solid rock were used as habitations, whilst the lower small sandy plain was used as a burying-ground, in which unmistakeable tombs are to be seen.

When I was at Guli Guda, talook Badami, I found a cairn and three cromlechs or kistvaens of the smaller size, $2\frac{1}{2}$ by 3 feet, half buried in the ground. This settlement is close under a tank, and I have no doubt parts of it may have been covered by the bund. When I was at Dharwar Mr. Young, one of the Assistant Surveyors, told me he found a large settlement near the village of Giwalli, two koss east of Guli Guda. I shall not fail to visit it on my return, and to give you an account of it.—(*Extracts from the letters of the Revd. G. Keis.*)

REMARKS ON MR. KEIS' OBSERVATIONS.

As far as the Rajăn-Kolur and Hăggăritgi remains are concerned, I cannot agree with Mr. Keis' hypothesis that the erections were houses. No open cromlechs exist at Hăggăritgi; all are closed kistvaens, both at the sides and top, and so closely that it would have been impossible for anything larger than a rat or a lizard to have got inside. Those opened had been deeply let into the earth, and it required a great deal of labour to throw down one of the side-slabs, so as to expose the interior. The contents I have already described as agreeing with those noted by Captain Congreve. All the kistvaens have not the circular aperture; nor where it exists is it in any case large enough for any human being except a mere child to pass through it. None of these, therefore, by any possibility, could have been dwelling-houses of full-grown adults; for we see by the skeletons, that though

these people were not tall, yet they were thick-set and stout, and the idea of anything but the largest cromlech containing a family is not tenable.

At Rajăn-Kolur there are a few cromlechs open to the south, but by far the greater number of the erections are kistvaens closely put together, and all that I opened, whether with holes in the side, or without, contained the same urns full of charcoal, earth, burnt bones, and ashes, as at Hăggăritgi. Many of these are upon the solid rock, and others where the soil is a few inches only in depth; but in these instances earth had evidently been filled in. What the precise intention or use of the cromlechs was seems to have puzzled many learned antiquaries, and many theories have been advanced on the subject. My own impression is, that they were temples in which the sacred fire was kept burning, and where ceremonies for the dead—perhaps sacrifices—were performed. They have no appearance, beyond their construction, of dwelling-houses, and even the largest of them at Rajăn-Kolur,—nearly as large as any yet discovered in the world,—would afford very short and scanty room for a family.

The circles of stones or walls round the cromlechs mark, even more strongly than in the others, their Druidical character. Captain Congreve states that "at Ter Dryn, in Anglesea, are also relics of a circle of stones, *with the cromlech in the middle*, but all are imperfect." And other instances are given of "temples with walls of rough stone about them," not only on the Nilgherris, but in Wales, Anglesea, Dorsetshire, &c.

Of the character of the remains at Yemmi Guda I have no doubt: the only remarkable point about them is that so many should be empty. Closer examination might help, perhaps, to correct this impression as to all, and perhaps also to show that the tombs in the sandy plain below the cromlechs were those of the tribe, or portion of the tribe, which buried the dead; though, from the fact of there being tops to some cists, this may be doubted; and that the whole belong to the same tribe at different periods. I much regret that Yemmi Guda is too distant from my district to enable me to pay a visit to this remarkable place, which is evidently worth minuter examination than Mr. Keis had leisure to bestow upon it. The situation of the remains on the summit of a high hill suggests that it may have been one of the fortified camps of these tribes, and it is not improbable that traces of circumvallation or entrenchment might be discovered among the jungles, or on the tops of the hills. Yemmi Guda is situated in H. H. the Nizam's Territory, in the talook of

Kanacgiri, and would be easily accessible from Dharwar or Bellary. It is evident to me that many remains not yet known exist in the Dooab between the Krishna and the Tungbhuddra ; and if the Scythic tribes spread along the Upper Ghâts,—which I conjecture to have been the place in the first instance of their irruption,—these remains, and those which exist in the Sorapûr country, which I have traced as far as the Bhima, are evidences of the journeys and locations of the tribes to the eastwards, in the direction of the centre of the peninsula, where it will be seen they abound.

That the Bellary district has many there can be no doubt, from the subjoined list kindly supplied by Mr. Pelly, Collector of Bellary, who, at my request, collected reports from the Tehseldars of the Collectorate. I expected, as a link between the Southern Dekhan and the Nilgherris, that the Bellary district, and perhaps Mysore, would afford evidences of the residence of Scythic tribes, but I was hardly prepared to find that so many existed as are detailed in Mr. Pelly's list, which amount in all to 2,129. All these lie to the south and south-east of Bellary, and from what Mr. Keis has stated, I am of opinion that others may be found to the NW., and perhaps west also of Bellary. The remains appear to consist principally of cromlechs, kistvaens, and open cists ; and it is probable, in regard to the latter, as remarked of the remains at Dhavah-doola-conda, that the top-slabs may have been removed by villagers for their houses. Those at Mudhegâllar, which are the most numerous, are evidently kistvaens, or closed cromlechs, having four side-slabs, and one as a cover, one of the sides having an aperture in the centre. None, or but few, of these erections appear to have been examined by the Tehseldars, which is to be regretted, though there can be no doubt, agreeing in form and construction as they do with those in Sorapûr and elsewhere, that funeral urns would have been found in them. Of the whole, 73 are returned as having walls round them, probably as some at Yemmi Guda, but there is no mention of cairns existing separately from the erections, nor are any measurements recorded. In regard to the whole, there is the same tradition as exists here, in Great Britain, France, &c., that the erections were constructed by dwarfs, and the same name, "Mohorie" or "Mora," agrees with that of these districts. The term "Gujari" is new to me, but appears to have the same local signification as the other.

I was in hopes that some considerable remains might have been discovered in the Dharwar and Belgaum Collectorates ; but with the exception of those noted by Mr. Keis at Giwalli, in the Badami talook

of Dharwar, I have heard of no others. It is not improbable, however, that direct communications may have been made to Government on the subject by the Collectors, in pursuance of the circular issued.

REMAINS IN THE VICINITY OF HYDERABAD (DEKHAN).

From what I had heard from the late Dr. Walker, whose curiosity and interest had been excited by what he saw of the Druidical remains of this district, I supposed that several groups of cairns were to be met with in the vicinity of Hyderabad ; but it was not until I had engaged the co-operation of two zealous friends there that I was able to ascertain any particulars of them. They prove to be entirely cairns, and in far larger numbers than I had any conception of, or than exist in the Sorapûr country. I have not been able to obtain plans or surveys of the localities as I wished, nor even to have an account of the numbers of the cairns in each, but am enabled by my friends Dr. Bell and Captain Doria, to give some interesting particulars of cairns that have been opened by them, and of their contents.

1*st*.—The cantonment of Secunderabad is six miles north of the city of Hyderabad. At the western extremity of it, beyond the horse artillery lines, and those of a regiment of native infantry which adjoin them, there is a large field of cairns on the slope of a rocky hill, leading down to the Hassain Sagor Tank. These are described to be of single and double circles of stones ; the cairns to be placed irregularly as to position—that is, not in lines or rows ; and of all sizes, from 12 to 24 feet in diameter ; the area enclosed in the circle-stones being heaped up with small stones and earth, forming a small tumulus. There are no cromlechs or kistvaens. I am not aware that any of these have been opened ; at least I have no particulars of any.

2*nd*.—Near the hill or rock of Moul Ali, about four or five miles NE. of Secunderabad, and in an open elevated plain, part of which forms the Hyderabad race-course, there is another large field of cairns, containing, I understand, some hundreds similar to those noted above. Some of these have been opened, and I subjoin an account of two received from Dr. Bell :—

" We have again been at what ——— calls the sinful occupation of digging up men's bones, and with some success ; as in one or two respects the cairns are different from those at Narkailpalli, although not materially so. Hampton and I opened two at Moul Ali, where they are in plenty. The same arrangement of the parallelogram exists, and the same directions are taken as at Narkailpalli—the long direction of the graves (N. and S.) ; and the peculiarity consists in the

tops not being covered by granite slabs. In one it was partially so, but in both, the whole interior was filled up with loose stones and earth, evidently not carelessly thrown in, but placed with care. This made it tedious work for the coolies, and destructive work to the pottery, for scarcely any was got out entire. However, what was recovered does not differ in shape from the drawing of that which you sent me. The *bones are all mixed*, so that I could trace no position likely for a body to be placed in."* In one cairn the articles in the accompanying sketch (No. 9) were found. The bell is very perfect, and is copper, with an iron tongue, which is still *in situ*, and moveable. The other things I take to be links of a chain. There are several. The size of the interior of the cairn was nearly the same, 6 feet long, 6 feet 6 inches deep, and 3 feet broad. Both the cairns here and at Narkailpalli are near trap (greenstone ?) dykes, and at both places the circles are formed with blocks of granite, and the central pile, of black stones from the dyke.

3rd.—At a small village about midway between Moul Ali and the cantonment of Bolarum there is another group of cairns, similar in all respects to the others, but not so numerous: of these, one or two have been opened, with similar results to those of Moul Ali.

4th.—The discovery of these groups led to investigations in other quarters, and Captain Doria, who is employed in the construction and repair of the high-roads to Masulipatam and Madras, found that the high-road at Narkailpalli and Haitipamla passed through large fields of them. Hearing of these, Dr. Bell, in whose division of statistical investigation these villages are situated, visited the spot; and I copy his letter to me on the subject:—

"I have just returned from Narkailpalli, and certainly there are cairns to be seen in abundance: a large patch to the south of the travellers' bungalow, another to the west, and a third to the south of the village, the shape of each being a parallelogram; but I did not observe that the circles were arranged in diagonal lines or straight ones, and there were no upright stones to mark the regularity of the position, as you described to me. The circles described by the stones were so variable in diameter as to give me the idea that no regular arrangement had been attempted, but the parallelograms extended from east to west in all. The generality of these cairns have immense quantities of small stones thrown upon them; some a few only, and others none; and it was one of the latter that I opened. After clearing away the

* This agrees with the confusion observable in the Jiwărgi and Andôla cairns.

earth to the depth of 2 feet 6 inches, we came upon the covering slabs, which were three in number: these were raised, and the size of the enclosing slabs measured. The side ones were 5 feet 10 inches by 5 feet 4 inches, the end ones 2 feet 4 inches by 5 feet 4 inches, the one at the bottom 5 feet 10 inches by 2 feet 4 inches. The top was closed by three pieces. On clearing away the fallen earth, we came upon a row of pots at both ends, and in the centre a skeleton, lying in such a position as to leave no doubt but that the corpse had been placed upon its belly. A piece of iron was found among the bones of the left hand. In one of the urns were portions of the bones of a child calcined; the rest were empty, or partially filled with earth.

"This no doubt was a small cairn; for two others had been opened by natives, and the slabs in them (which they were unable to remove) were double the size I have mentioned, and so also were the diameters of the superficial circles. This was only 16 feet from east to west, and 18 from north to south. In all three the graves extended north and south, and my skeleton had its head to the north."

I enclose a sketch of two of the vessels. (Vide Nos. 4 and 5 of Sketch No. 10.) Dr. Bell subsequently informed me that he had met with patches of cairns in the Elgundal Sircar, near the Jaghir village of Telghir, in latitude 18° 35′, long. 77° 16′, six miles from the large town of Tarapilli: these differ in no respect from those he had seen before, and he regrets he had not time to examine them.

Captain Doria, who was encamped on the same spot, made several excavations at Narkailpalli, and I subjoin his letter on the subject, dated 12th April 1852, Camp at Kătăngur:—

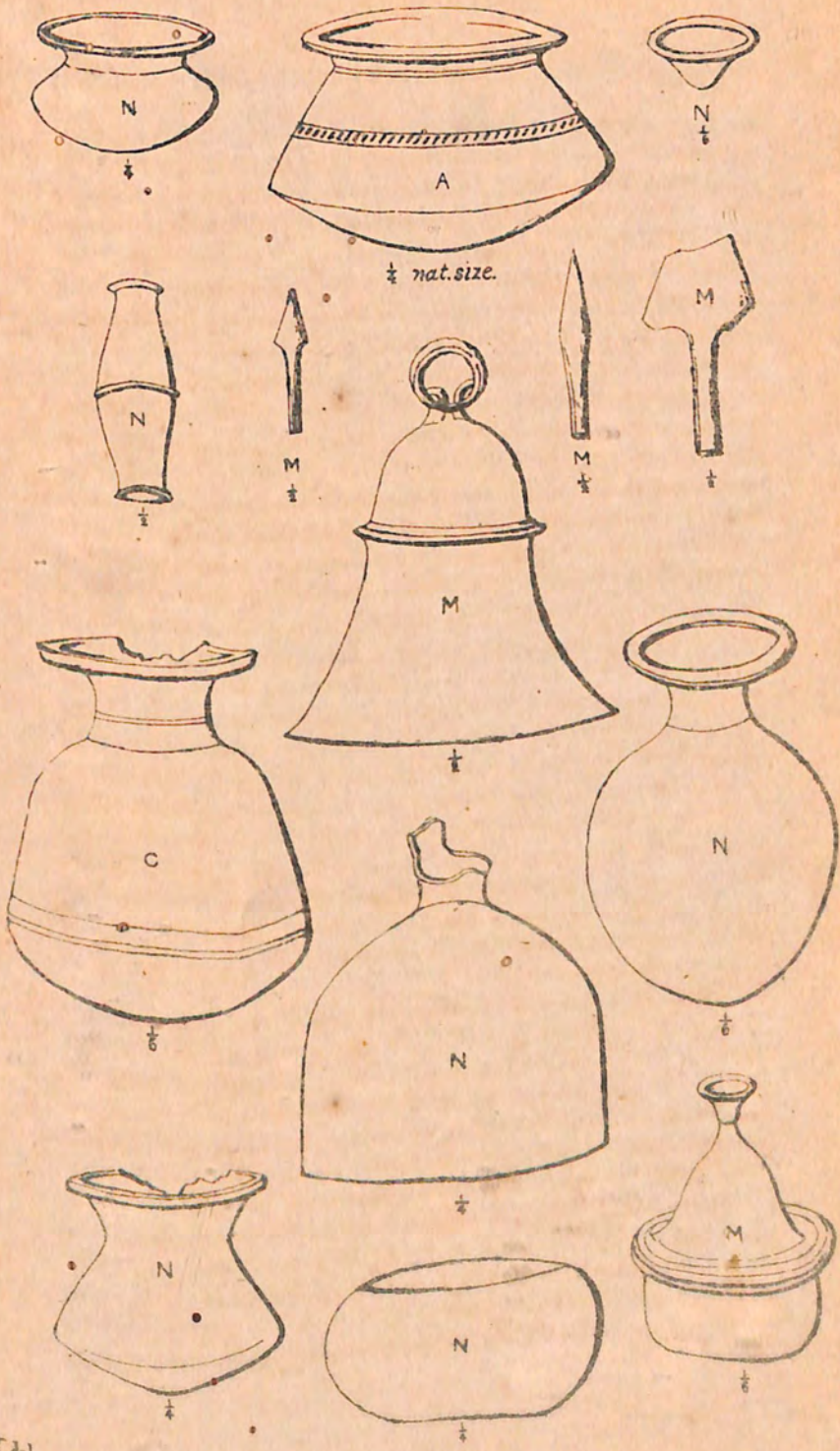
"I received a few days ago your letter relative to the cairns, about which I shall be glad to give you any and every information in my power. I opened ten or twelve of them at Narkailpalli, and other places, but they were so tremendous in size and depth that it is a work of some considerable labour.

"They present themselves in this part of the country in large masses or numbers, never in any regular figure, but generally along and around the base of some stony slope or hill, though they do occur on the open plain and banks of the river. Whether the former positions have been assumed from the facility of procuring the stones which fill up the upper part of the mound which caps them, and of the large circles of stones which encircle them, I know not; but it is an observation I have made, that they are always in a stony vicinity. They are innumerable about here, amounting to thousands: you can hardly move two or three miles in any direction, without meeting some of them. From

the Musy river, on both banks, in a SE. direction by Anapilly hill and Narkailpalli, where they surround the hill, (800 feet high on the north side,) and extend a little to the east; there are none on the west, and only a few on the south, but some hundreds on the north, some very large. At Haitipamla, and down to Davarconda, they abound. The high road runs through a regular field of them at Haitipamla; but, with the exception of the stony vicinity, I do not see any peculiarity in their construction or position in regard to one another.

"In size there is a difference, some being of gigantic dimensions, and composed of blocks of stone, very difficult, nay impossible, to remove without mechanical assistance, both as to the size of the stones which compose the outer rings of the tumuli, and also the large slabs which form the inner cell or tomb wherein the body or bones are placed. The diameter of some of the large tumuli is from thirty to forty feet; others again are much smaller, and on them a much less amount of labour has been bestowed. The depth of some of the large ones is very considerable. You first dig through a mound of from three to five feet deep, out-cropping, and bounded by these immense circle-stones, and composed within of smaller stones and earth, which brings you down to the level of the ground about. When you dig down again some eight or ten feet, you reach the regular tomb, which is composed of eight immense slabs of gneiss or granite, forming an enclosure of eight to nine feet long and four to five feet broad, giving a total depth from the top of the mound to the bottom of sixteen to twenty feet. In digging through the mass of earth I have invariably found earthen jars of various shapes, some with covers, some open like saucers, and others much like the earthren chatties now used by natives, except that some are beautifully glazed, and something in shape like these figures, placed at the south corners or feet of the tombs, and about half away between the slab and the top of the ground. These jars sometimes contain calcined bones, but others are merely full of earth, as if they had been placed there empty, or filled with something that has decayed, (I conjecture rice or grain,) and given place to native earth.

"In the cell itself, which is always filled with white-ants' nests, I have always found more jars similar to the first, and filled, like them, with burnt bones and earth. I have generally found the skeleton entire under white-ant earth, but the bones so decomposed that they have fallen to pieces almost on the slightest touch. The cells are



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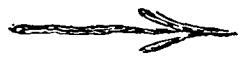
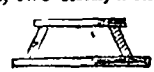
always due north and south, and the skeleton placed in the same direction. At the head, or north end, I have generally found a piece of iron, which might have been a knife or a sword, but almost rusted away, and also arrow-heads of the double-barb shape.



In one I found a mass of iron, which must, when new, have weighed several pounds. I also found round the neck of a skeleton a charm or ornament, composed of enamel, and bored through, for suspension I imagine. In some of the cells an upright stone slab, some two feet high, divides the cell into two parts, always longitudinally, that is north and south. In one cell I found a bell of copper, much corroded, about an eighth of an inch thick, and six inches diameter, which I shall send you with some of the pottery, and shall be glad to open more cairns for you if you wish it.

"I do not think myself that these remains are so ancient as people imagine, but I incline to the opinion that they belong to a wandering race of people, Nomades, whose only habitations, except their tents or huts, were those built for the dead; for people who could build so well and so substantially for the dead would surely have left something in the way of temples or other buildings for the living cotemporary with the tombs, if they had existed as a settled people. The bones found in the pots lead me to suppose, either that only one sex was burned, and the other buried, or that each tomb was not the resting place of one individual, but that each belonged to a family; and that when a second body was buried, the bones of the first were taken up, placed in a jar, and re-buried. In the tombs with a division two bodies were in each, one on either side. I am not enough of an anatomist, nor are the bones so strong as to bear the handling, necessary to determine the sex of the owner." In a subsequent letter he writes:—"I have not been idle about the cairns: we have found several other masses or groups of them; but as yet the ground is so fearfully hard that I have not opened them. There is a village a few coss from this, Nacracul, where the people tell me there is a coss of land covered with them." Again, "Camp near Davarconda":—"The cairns are innumerable about here, and of immense size; they are composed inside of one enormous slab below, two sides, two ends, and one or two slabs on the top, built in this fashion—



with a division about two feet high in the centre, lengthways. The depth of the cairns about ten feet, all north and south, with the skeleton laid north and south, *on its face*. No one

seems to care for the cairns, or to open them. The people say they were built by the Rajuses."

Captain Doria again wrote, 13th August, forwarding me the two copper bells, one from Moul Ali, the other from Narkailpalli, and the copper cylinders, arrow and spear-heads, pottery, &c., which I have drawn from actual measurement (sketches numbered and attached): all these articles will be transmitted to the Society on the first opportunity. Captain D. mentions that he has discovered another new place, where there must be at least two thousand cairns, and is about to open several of them for me. Should I hear anything of interest from him, it shall be transmitted hereafter as a postscript to this communication.

CAIRNS NEAR GURMATKAL.

As I was proceeding by dâk last year to Hyderabad, I observed what appeared to me a large field of cairns about two miles west of this town; the circle-stones were large blocks of chert. I had not time to examine them closely, and, unfortunately, having been detained, I passed the same place at night on my return, but I have marked the locality for future investigation, as lying nearly midway between Sorapûr and Hyderadad, on a high and fertile plateau, which breaks into deep grassy and woody ravines to the south, while the country is amply supplied with water; it would in all probability have been a favourite resort of the nomadic tribes, and would serve to prove that they had marched off to the north-east from Sorapûr instead of north or north-west to the Central Dekhan.

It will be evident to the Society that the whole of the Hyderabad cairns are of the same character as those in the Sorapûr district, on the Nilgherris, and in Europe. The same circles of stones, some gigantic; the same interior cists, differing only in the quality and size of the slabs used; the same vessels interred, having in them calcined bones, ashes, and charcoal; the skeletons in the cists; the calcined bones of children in urns; the iron implements and weapons, beads, &c.; the same laborious and patient construction of the cists and graves; above all, the discovery of two *bells*, leave no doubt whatever in my mind of the identity of the whole as Scytho-Celtic or Druidic monuments, and completes the only link wanting in the chain of identity. The discovery of a bell has been wanting in the Sorapûr cairns as yet opened, but it is evidently a matter of entire chance where one may be found. Captain Congreve mentions that he opened forty-six cairns in the Nilgherris, but only found two bells; Captain Doria ten or twelve, and only one; Dr. Bell three, in one of which one was found. It is probable,

perhaps, that these articles were sacred in the families of chiefs or priests, as they are among the Thautawars of the Nilgherris at the present day, and that the cairns in which they are found were those of chiefs or priests. I subjoin a few extracts from Captain Congreve's article, not only to prove the identity of these bells with those in cairns at the Nilgherris, but to substantiate the Celtic-Scythian character of these and other articles.

Mr. Hough, in his Letters on the Nilgherris, says :—"A few of these barrows have been opened; in one were found *iron heads of spears*, about four inches long, very well finished, and in a perfect state, but they began to corrode soon after exposure to the air. The same barrow contained *one bell* entire, and the broken fragments of another.

"Hearne, who is justly ranked with Leland, Ashmole, and Anthony-a-Wood, as an eminent antiquary, tells us that on one of the stone monuments at Stanten being opened, it was found to contain a spear, and a large *bell*, with a screw at the end of it.

"Douglas, in his *Nenia Brittanica*, recording the opening of the barrows in Greenwich Park, states that among other articles found in them were *spear-heads, iron knives*, and some cloth.

"The resemblance thus shown to subsist between the Thautawar and Scythian barrows and their contents is too striking to be the result of accident: the fact of so unusual an article of grave furniture as a *bell* being found in both cases is very singular.

"In opening a cairn six miles to the north of Conoor, *two bells* were found among a great number of other antiquities.

"I said lately that bells were frequently found in digging open the cairns; indeed I discovered two in a cairn at Conoor. With reference to this fact, and in further proof of the cairns having belonged to the ancestors of the Thautawars, I quote the subjoined passage from Harkness' description of a singular aborginal race, inhabiting the summits of the Nilgherri Hills :—

"'A bell, which is generally deposited in some niche within the temple, is the only object to which they pay any reverence. To this they pour out libations of milk, but merely as to a sacred implement. They do not sacrifice or offer incense, or make any oblations to it, significant of its having any latent or mystic properties.

"'To each Teriri (priest) is attached a herd of milch buffaloes, part of which are sacred, and from which the milk is never drawn, the whole being allowed to go to the calves. One among these sacred animals is the chief. Should it die, its calf, if a female one, succeeds to its office. Should it have no female calf, the bell before mentioned is

attached to the neck of one of the other sacred ones, and being allowed to remain so during that day, a legal succession is considered to be effected.

"'In the morning the Pol-Aul milks one portion of the herd, carries the milk into the temple, leaves the bell with a small portion of it, and of such portion of it as he may not require he makes ghee.' —*Madras Journal*, No. xxxii. pp. 95, 96.

"The bell was an object of superstitious regard among the Celto-Scythians, who buried it in their graves. Speade, in his *Chronicles*, represents an ancient Briton with a lance in his hand, to the end of which was fastened a bell."

The foregoing will, perhaps, be deemed sufficient proof in regard to the Celtic-Scythian character of the bell, as found in the cairns in the Hyderabad country. In other respects, of pottery, burial of the dead, &c., there is, as I have already stated, no difference worthy of notice. The colour of the pottery also agrees with those of the Nilgherris, and these again with those of England. Captain Congreve remarks on this subject :—"It is very remarkable that the resemblance between the urns found in the English barrows and the urns of the Nilgherris extends even to the material. In some of the Dorsetshire barrows the urns are made of a highly finished and glazed red pottery. Many of the Nilgherri urns have been admired for this rich red glazing, particularly one discovered by Mr. Moegling. The zig-zag or arrow-headed moulding, which is the usual ornament of the Celtic urns, is conspicuous on all found on the Nilgherris. I have not as yet found any entire urns with the zig-zag moulding, but I have seen it in several instances on broken pieces of pottery, red and black, found in the cairns."

Need I trace the analogies further? I think not; as in what I have detailed there must be ample proof, to the most sceptical, of the various points of resemblance and identification on all the subjects I have noticed: that the Celtic-Scythian tribes settled more numerously in the direction of Hyderabad, or SE. from it, about Nalgundah and Davarconda, than they did in this, or even the Bellary district, there can be no doubt. Those tracts, and for some distance along the north and south banks of the Krishna river, are, even still, principally low grassy jungle and forest, well supplied with water. They are the favourite resorts of the Brinjaris, who carry grain and salt for the capital, and were no doubt well fitted to the pastoral Scythians. Only a very small portion of that district has been examined by Captain Doria, and it is impossible to say in what numbers the cairns may not exist in other localities of the centre of the peninsula than those he has mentioned.

The late Captain Newbold, it is known, had discovered great numbers of ancient remains near Chittoor.

The remains of the Celtic-Scythians as yet discovered in the Dekhan and Carnatic may be classed as follows :—

1. Cromlechs without circular enclosures.
2. Ditto with ditto.
3. Kistvaens with and without circular apertures in one monolithe, containing urns filled with earth, bones, ashes, and charcoal.
4. Open cists.
5. Barrows containing one or more cairns, as at Shahpur.
6. Cairns with single, double, and treble circles of stones.
7. Cairns with cists of stone below, containing skeletons, remnants of weapons, bells, urns, cups, and other pottery. Sorapûr, Moul Ali, Narkailpalli, Davarconda, &c.
8. Cairns containing no cists, but urns filled with ashes, bones, &c., as at Chikănhălli.
9. Temple, or large altar rocks, surrounded by a double ring of large stones and entrance, as at and near Shahpur.
10. Diagonal lines of stones or rocks, as at Vaibăthălli, Shahpur, Ijére, &c.
11. Square platforms, enclosing cairns, as at Măndiwalli.
12. The large tumulus and rocks at Shahpur.

The three last have no representatives among the authorities quoted by Captain Congreve, nor among his own discoveries ; but who can doubt that they belonged to the same people ? The links that are still wanting are—

1. Remains of circular forts, with trenches round them, as on the Nilgherris, Old Sarum, near Stonehenge, and Cærleb in Anglesea.
2. Barrows, with trenches round them.
3. Circular basins in beds of rivers.
4. Tolmen, or holes bored in rocks.

Tors and loggan-stones exist in thousands all over the rocky granite hills of the Hyderabad country and Sorapûr ; and in many places the granite rocks are piled on each other in most fantastic shapes, with separate tors crowning them, and appearing as if a push would throw them over. Many of these may have been sacred.

On all other points, I must consider the identity to be complete, and I am assured that further investigation, wherever these ancient monuments may be found, will only serve the more to confirm what I have already detailed.

I am not sufficiently experienced in the antiquity of this subject to presume to offer more than a few very general observations upon it; but I cannot believe that one of such general antiquarian and ethnological interest can fail to excite attention and investigation, in proportion as the actual monuments of Celto-Scythic tribes are found to exist in India, and, being examined, are found to agree in all respects with those of Europe. I cannot, with the ample proofs before me, admit the opinion that such resemblances are merely accidental, as is suggested by the Revd. Dr. Schmid in a notice of the subject in connection with the papers of Captain Congreve and the Revd. W. Taylor. In no country that I am aware of are the rites of burial of the ancient inhabitants so marked and peculiar in character, and so entirely agreeing in detail as those of the Celto-Scythic tribes in the east and west; and if the aborigines of India had been all of the same character and religion at the period of these remains, it is only fair to suppose that these cairns and cromlechs would not be found confined to particular localities, but would be universal all over the continent; and their construction, defying alike the hand of time and the changes of faith, would have preserved them wherever they had existed. Further, that had this particular and very peculiar mode of sepulture been universal among the ancient tribes of the world, they would be found to exceed any that have been as yet discovered, whether in Europe, or in Asia and India, and would also be more generally diffused than they are found to be. Many parts of Africa are well known, and have been carefully observed by antiquarians, ancient and modern; yet I am not aware that any traces of Celto-Scythic occupation, as existing in these monuments, has ever been discovered. Though Dr. Carter surmises them to exist in Southern Arabia, which is far from improbable, America, South and North, has its ancient graves and tumuli of a character peculiarly their own. In Europe they are by no means universal, being confined to particular localities, where from authentic history it is indubitable that Celts of the Druidic faith overran the country, and finally settled. In India, it is true, we have no such confirmation by history, and the migrations of the tribes from Scythia cannot be so distinctly traced south-eastwards by these memorials as they can be to the west. The Romans and Greeks have preserved historical records of the migrations of savage pastoral and warlike tribes from Central Asia from time to time, and through many ages, to the west, where they gradually settled, but there are none such in India; and reverting to those dark ages when India, before the Buddhists and their successors the Hindus, was a country without civilization

of any kind, possibly inhabited by a Hameatic race, we may presume, from the memorials we find to exist corresponding with these general migrations of the Celtic-Scythians, east and west, that other hordes of the same people at a far earlier period of time may have directed their course southwards, and gradually settled in those fertile spots in India where we now find their remains. Mere distance appears to be no objection to this hypothesis; nor, in the nature of the country, nor its climate from Central Asia to the Deccan and Southern India, is there any physical obstruction to the gradual migration of hordes of pastoral people, alike from their food and habits accustomed to rapid travel and conquest. After settlements had been made, it is not, perhaps, probable that the original stock of invaders was long reinforced from their native country. Other outlets for emigration were found east or west, and these were followed with greater perseverance, and up to a later period of time, on account of the more temperate and bracing climate to which they led, than those to warmer and more relaxing regions.

By what routes these tribes invaded India I will not presume to assert; but it is not improbable, I think, if public attention is continued to the subject, and the Provinces of Scinde, Lahore, &c., or those which, from geographical position, afford most presumption of having been the routes of migration, are duly explored, that traces may be found of the same memorials as exist in the Dekhan and Southern India, which would amount to proof, or strong presumption, of the lines of march. In the act of migration, the graves and stone erections would necessarily be more incomplete than those constructed by a settled people; but it is not, perhaps, improbable, that evidences of settlements would be found.

Assuming, then, from the ancient monuments in existence in the districts I have already enumerated from my own observation, and from those in more Southern India, on the Malabar Coast, (the Pandoo Coolies) and especially on the Nilgherris, (all agreeing generally and particularly in construction and contents, not only with each other but with those of Europe with which we are best acquainted,) that Celto-Scythic tribes did inhabit these countries,—we have fortunately, in corroboration, the most interesting proof, perhaps, of all, that they were such, in the roots of their ancient language being traceable in Tamul, and from it to Canarese, Teloogoo, and Malyalum. Dr. Schmid's knowledge of the present dialect of the Todawars or Thautawars enables him to state that this, with the more modern languages just mentioned, " are links of a closely connected and unbroken chain of dialects of one original language; and that the Todawar

dialect is by far more closely connected with the Tamul than the Canarese." He, in fact, assumes it to be more ancient than the Tamul, which in its turn is more ancient than the others. Captain Congreve gives some striking resemblances of words in use among the Todawars with Celtic, Gothic, and ancient Tamul; but the most striking and interesting fact I have met with on this subject is that given by Dr. Schmid, who states that Dr. Rückert, Professor of Oriental Languages in the University of Berlin, had discovered, and independently from his own studies and investigations, that the Tamul language has a remarkable analogy with Tartar dialects. Dr. Schmid is therefore confirmed in his previous supposition and hypothesis, "that by comparing the genius of the Tamul language with that of other tongues, the race or tribe which afterwards split into Tamulians, Malialis, Canarese, and Telingas, must be a Caucasian or Himalayan race, and must have immigrated into the plains of India very early." Nor, in connection with this, is it the less remarkable, that the memorials which exist should *only be found* in the districts in which one or other of these dialects of Tamul, or Tamul itself, at present exist. That of Sorapûr is Canarese, of the Hyderabad Country Teloogoo, of Mysore and Bellary Canarese, of the Malabar Coast Malialum, while pure Tamul exists in Arcot, &c., where these remains are found. I have no doubt, therefore, that under the encouragement for inquiry and identification which presents itself in all forms, these eminent philologists and others will continue their investigations on the subject, which cannot fail to prove of the highest interest, and which, even beyond the fact of actual remains, will establish the migrations and settlements of Celto-Scythic tribes by the roots of their ancient language—the highest proof of all. In the Revd. W. Taylor's paper (No. xxxiii. *Madras Journal of Literature and Scienc*) I find the following speculations, which have reference to the above, and may be quoted in illustration :—

"When the Pauranical accounts of the Hindus close, the ascendancy of barbarous races is mentioned. Sir William Jones gives the names Abhira, Gardabin, Cauca, Yavana, Turashcara, Bhurunda, Maula. Wilford gives Abhiras, Sacas, Tushcaras, Yavanas, Maurundas, Maunas, and Gardhabinas ; and Southern Tamil MSS. as stated by me in *Or. Hist.* MSS. vol. i. p. 247, give Abiral, Gardhabiyal, Buva, Phigal, Yavunal, Maruntiral, and Mavunal. Now of those names the Abhiras are probably Affghans, the *Sucas* are Scythians, *i.e.* Siberians; the Tushcaras, Parthians or Turcomans, and the Marundas or Maunas, or Mavunal, most probably Huns. It is now some eleven years ago since I read a little Tamil book prepared by the Revd. B. Schmid for

a seminary, and I found him stating from German authorities that the Huns had ravaged India as well as other countries. I have very recently conversed with Dr. Schmid on the subject; and I believe that there are many German works that may throw light on the emigration of people from east to west. Wilford considers the Marundas or Maunas to be Huns. The Tamul has no aspirate, and Mavunal may be (without the Sandhi) Mă-Unal, the great Hun people. The Abhiras are sometimes considered as equivalent to Ar-viral, or six-fingered people; and tribes so distinguished are said to have been known. A wide field enough is certainly opened; but if the Celtæ were known in Lesser Asia, by the names of Titans and Sacks, and as the Cymri in Wales, that alone is almost sufficient to throw a light upon the existence of cromlechs in the Carnatic. For the Sacks were doubtless a branch of the Sacæ or Scythians (not descended from Gomer, but closely related); then it may follow that the Danes, Cymri and Scythians had customs in common—the use of the cromlech (I will add cairn also) being one of them; and that the Sacæ or Scythians penetrated through the length and breadth of India seems more than probable."

Of the existence of barbarous tribes in India before the establishment of Hindu dominion, there is ample proof, which I need not enter into. We see that under the irruption of Bhuddistic and Hindu tribes, that the aborigines of India, for so these Celtic tribes must have been in relation to them, were gradually absorbed; that their language was changed, and their mode of life; that village communities were established; towns, cave and other temples gradually completed; and civilization, and the use of written language, and with it theology and science, gradually introduced. It must needs have been in the outset that these civilizing influences, carried forward by more powerful and more warlike tribes than the Scythians or their rude descendants, who probably encountered them, soon obliterated in Southern India all traces of the ancient Druidic faith, and that the people who had held it either mingled with the conquerors, or fled into impenetrable jungles, or mountains inaccessible to them. Such a remnant we may well presume the Todawars to be. Their almost European colour, and Caucasian features; their pastoral lives and social customs, food, mode of burial, and sacrifice; their great antiquity, as allowed by the Buddagars, and traceable beyond the Pandawar dynasties—the memorials of whose victories over them are found upon the Druidic cromlechs; the great number of cromlechs, kistvaens, cairns, barrows, circular forts, &c. &c., and their contents, agreeing with those of the plains—probably the most ancient; their even present freedom from

idolatry, while surrounded for ages by Hindus ; their reverence for the sun and fire; even their mode of dress, all corresponding with Celtic customs and usages ; above all their language, admit, I think, of no doubt that they are the only true remnant in India of the most ancient of the Scythian tribes, and that they were driven to the Nilgherris from the plains, where I believe these memorials to be more ancient than those on the Nilgherris, and more purely Scytho-Druidic. Captain Congreve classes the remains on the Nilgherris into three kinds. The oldest are the simplest. In the others are found traces (by figures, &c.) of Bhuddistic or Jain corruption, which occurred probably when the Jains had possession of the hills, and from which the Todawars are again become free. The height of the mountains; the coldness of the climate ; the deep belt of almost impenetrable jungle which surrounded them on all sides, and its extreme insalubrity—all combined to preserve them from any serious molestation by the Jain or Hindu kings; and the salubrity of the climate above, suited to their originally hardy constitutions, has preserved them hitherto in vigour, though reduced to a comparatively small remnant.

I will not attempt to offer an opinion on the antiquity of these remains. Druidism, or Druidic-Scythism, one of the most ancient religious beliefs of the world, is here evident ; and while we find that all comparatively modern irruptions of Central Asiatic barbarians into Europe, the Huns, the Getæ or Goths, the Alani, &c. were idolaters, we are carried back insensibly beyond them to the ages of a simple faith which was held by their progenitors, and followed in those parts of Asia and Europe in which the emigrant hordes gradually settled, where their memorials are found to exist. The identity of these remains, however widely separated from each other, I can see no reasonable ground to doubt under the evidences before me, and trust that the Society may be enabled to obtain such further information of Scythic monuments, and their contents, as may lead to a more complete understanding of the districts inhabited by the tribes. My impression, however, is, that they will be found principally in, if not entirely confined to, the central, southern, and western portions of the peninsula—in short, to those districts in which the traces of their ancient language are most apparent.

" But what the same historian, Herodotus, liv. c. 71, 72, relates concerning the ceremonies observed at the funerals of their kings is still more extraordinary. I shall only mention such of those ceremonies as may serve to give us an idea of the cruel barbarity of this people. When their king died, they embalmed his body, and wrapped it up in

wax : this done, they put it into an open chariot, and carried it from city to city, exposing it to the view of all the people under his dominion. When this circuit was finished, they laid the body down in the place appointed for the burial of it ; and there they made a large grave, in which they interred the king, and *with him one of his wives,* his chief cup-bearer, his great chamberlain, his master of the horse, his chancellor, his secretary of state, who were all put to death for the purpose. To these they added several horses, *a great number of drinking vessels,* and a certain part of all the furniture belonging to their deceased monarch, after which they filled up the grave, and covered it with earth."—*Rollin's Ancient History,* vol. ii. p. 467.

Extracts from Mr. J. BABINGTON'S "*Description of the Pandoo Coolies in Malabar.*" (*Trans. Lit. Soc. Bombay,* vol. iii. p. 324.)

"Like the Pandoo Coolies on the eastern side of the Ghauts, the Kodey Kulls, Topie Kulls, or Pandoo Koolies, are generally to be found on the tops of eminences, or on the sloping sides of such hills in Malabar as are not wooded. They seem to vary in their shape according to the nature of the soil or rock on which they are constructed." The Kodey Kull consists of a stone like a native umbrella (from which it takes its name) placed over an excavation, and the Topie Kull an erection shaped like a mushroom : in the former, urns, human bones, arms, iron instruments of various shapes, and sometimes beads of different shapes, colors, and materials, were found, but in the latter nothing. "There are many places in Malabar where the Kodey Kulls are found ; but in no situation do they exist in greater numbers and preservation than on a hill named Chatapcrambah, which is excavated in every direction with caves of this description. It is singular that the Malayalum or Malabar name of this place should give a complete description of it ; being literally *the field* (compound, &c.) *of death,* Chatum peramba. Whether this coincidence is accidental, or the name was given to it originally, and handed down to the present race, I know not ; but I am inclined to be of the latter opinion, as there are several other places in the district with the same name, and I understand also of the same description with this spot, which is situated on a hill rising abruptly from the southern bank of the Beypoor river, and about five miles to the eastward of the village of that name." "It is almost unnecessary to say that there is no record of these antiquities, of the period of their construction, or the use for which they were originally intended."

Statement showing the particulars of Dwellings of Human Beings

(Communicated by C.

No.	Names of Talooks.	Names of Villages.	Distance and direction from Bellary.		No. of Dwellings.	Particulars of			
			Direction.	Distance, Miles.		Having a slab of stone on each of three sides as walls, and one above as roof, leaving one side open.	Having a slab of stone on each of four sides as walls, and one at top as roof, one of the side-slabs having an aperture in the centre.	Having a slab of stone on each of four sides as walls, and one at top as roof.	Compounds or enclosures built of stones enclosing dwellings of the above three descriptions.
1	Koodilghee	Halsagarum	S.	45	200	..	..	..	..
2	Hoovinhudgully	Rajahvalum	S.	56	33	..	..	..	31
3	Raidroog.....	Mullapoorum....	S.	30	485	..	3	..	18
4	„	Addagoopah	S.	30	525	..	..	..	17
5	„	Gollahully	S.	30	200	..	..	..	6
6	Kodecondah	Kondapoorum...	SE.	..	1	..	..	..	1
7	„	Poolaiy.....	SE.	..	1	..	..	..	..
8	Dhurumaveram.	Moodhegulloor..	SE.	..	580	..	580	..	..
9	„	Dhavadhoola-condah.	SE.	..	104	104	..	..	..
		Total.....			2,129	104	583	..	73

N. B.—Four of the Sketches and the figures of the Bells, Pottery, lithographed, the rest, with the Plans, are unavoidably postponed for a

III

of diminutive stature, situated in the Bellary District.

PELLY, Esq., Madras C. S.)

Dwellings.			
Having a slab of stone on each of four sides as walls, without any at top.	Having a slab of stone on each of three sides as walls, without any on the fourth side or top.	Having a slab of stone on each of four sides as walls, without any at top, one of the sides having an aperture.	Extracts of Urzees of Tehseldars on the subject.
200	..	..	Tradition says that former Governments caused dwellings of the descriptions alluded to to be erected for a species of human beings called Mohories, whose dwarfish stature is said not to have exceeded a span when standing, and a fist high when in a sitting posture, who were endowed with strength sufficient to roll off large stones with the touch of their thumbs. The dwellings in question contain nothing.
..	2	..	It is said that these dwellings belonged to a sect of human beings called Mohories. It is not known when and by whom they were erected for the Mohories, nor is any description given of them.
48	132	284	It is said that human beings of a diminutive size, called Mohories, occupied these dwellings.
51	243	214	It is said that these dwellings belonged to Gujaris, by whom they were anciently inhabited.
85	81	28	It is said that these dwellings belonged to Gujaris, and that they were anciently occupied by that class of creatures.
..	..	..	It is said to be a pagoda of the Pandwahs. On being dug up, a smooth long stone was found therein.
..	..	1	It is said to be a pagoda of the Pandwahs. On being dug up, some iron nails and plates were found therein.
..	..	..	It is said that human beings, dwarfs, called Gujaris, resided in these dwellings; that they were erected with no other material but flags of stone, from fear of showers of fire, and that the beings were under a yard in stature. One or two of these buildings were dug up, but nothing was found. The dwellings situated near Dhavadhoolacondah are without the flags that were placed on the top as roofs; they were carried away by the merchants of the village for their houses. It appears that a being of the description above given from Podiatoor visited Culliandroog a short time ago.
..	..	..	
384	458	527	[No measurements of any of these remains have been forwarded.—M. T.]

&c. which accompanied Captain Meadows Taylor's paper, have been future opportunity.—*Secretary.*

ART. V.—*On the Form and Structure of the Shell of Operculina Arabica.* With a Plate. By H. J. CARTER, Esq., Assistant Surgeon, Bombay Establishment.

Presented May 1852.

THE interest which attaches to the forms and structure of Foraminifera is naturally very great, for no one can have seen their beautiful little shells, and the extensive tracts in the Nummulitic series, which are almost entirely composed of their remains, without wishing to know something of the animals by which they were constructed.

Fortunately many are now living to help us out in this respect, and although for the most part very small, yet here and there are found sufficiently large, as will hereafter be seen, to afford us almost all the information we could expect to obtain, were the fossil species living, even in their largest forms.

In the month of June 1847, I communicated a paper to the Society, containing among other observations, a summary up to that time of all that was known of the structure of Foraminifera; and by way of introduction, as well as for the purpose of rendering this paper more complete and more useful, I will here insert the latter, adding what has been done since, and then a description of the form and structure of the shell of *Operculina Arabica*, which will, I think, elucidate all that has hitherto been stated of, and leave little to be added to, the general structure of Foraminiferous shells, both recent and fossil.

"For ten years after D'Orbigny gave his description of the animal of Foraminifera, no one appears to have taken much trouble to question its accuracy, until Dujardin took up the subject in 1835, while residing at Toulon (where he had ample opportunities of testing the truth of D'Orbigny's imaginary discovery), and after having carried on his researches most perseveringly for some time, at length came to the conclusion, communicated to the Académie Royale des Sciences de Paris in the month of June of the year mentioned, that the Foraminifera were not Mollusca, nor did they belong to any of the established classes.

"In describing their organization, Dujardin stated that all their

chambers were occupied by a red or orange coloured animal matter, highly contractile, and possessed of the consistence of mucus ; that this was susceptible of extending itself into threads which were filled with irregular granulations, but without the presence of any organs. On carefully observing these animals in their living state, he had seen, with a high magnifying power, in *Miliola* a soft mass projecting from its aperture (analogous to the substance of the interior), which slowly underwent a change of form, and from which a tuft of minute filaments radiated from a common centre of attachment ; these filaments prolonged themselves in ramifications to five times the diameter of the specimen *(Miliola)* from which they proceeded, and at length became of such extreme tenuity, as to be followed only by changing the direction of the rays of light. Further, he observed in these filaments a movement of *reptation*, by which the animal advanced from 5 to 6 millimetres per hour. The filaments appeared to be composed of a primitive animal matter, which extended itself forward in the manner of roots ; hence the name *Rhizopoda* which Dujardin proposed for these animals. In *Miliola* and *Gromia* these filaments came from their aperture ; in *Crestellaria* from the last chamber, and in *Vorticialia* from different pores of the disk.

" As to their manner of reproduction, Dujardin had noticed during the previous year, that in *Troncatulina*, the animal matter was grouped together in certain cases in globular masses, as the green matter of *Zygnema*.

" Finally, in concluding his communication he states, ' We see that it is impossible to keep these animals among the microscopic Cephalopoda : what rank shall be assigned to them ? ' *

" The discovery then of the animal of Foraminifera appears to be due to Dujardin.

" In November 1835, he exhibited at Paris several living specimens of *Vorticialia* and his genus *Gromia*, † and during that winter continued his researches into their organization with a view to establishing the relation that might exist between them and Infusoria.

" In comparing them with Infusoria, he states, in a note addressed to the Académie Royale des Sciences de Paris‡—' I have always been guided by an idea suggested by Bory St. Vincent, who, after having seen the living *Rhizopoda*, was struck with the great analogy which

* Acad. Roy. des Sc. séance Juin 22, 1835.

† *Ibid*, séance Nov. 15, 1835.

‡ Séance Fev. 1, 1836.

existed between the filamentous prolongations of these animals and the expansions of the *Amœba* or *Proteus*, and directed my attention to the point.'

"Lastly, Dujardin exhibited before the Acad. Roy. des Sc. at Paris in 1836 * some animalcules, called by Ehrenberg *Arcella aculeata*, but which Dujardin regarded as freshwater Foraminifera, and through these he imagined the series to be continued from the *Amœba* to *Miliola*,—that is, through *Difflugia*, a species of *Amœba*, to *Arcella*, from the latter to *Gromia*, and from *Gromia* to *Crestellaria*, and thence to *Miliola*.

"After Dujardin, Ehrenberg took up the subject, and the result of his researches is as opposed to D'Orbigny's description as it is confirmatory of Dujardin's observations.

"In a memoir read at the Royal Academy of Sciences at Berlin in 1838, † Ehrenberg stated that the Foraminiferous shells were inhabited by elegant little bodies which played an important part in nature, and the fossilized remains of which might frequently be found to number more than a million in a cubic inch of chalk; also, that after a series of observations made on recent species both living and dead in the Red Sea and elsewhere, he had come to the conclusion that their place in the animal kingdom should be among the Bryozoa.

"In the month of October 1839, ‡ Ehrenberg also exhibited living specimens of these animals to the Academy at Berlin, [two,] which were taken at Cuxhaven, and in January 1840 he exhibited ten other species of these animals, § at the same time communicating the following observations on their organization:—

"'The first and largest cell of these animals, sometimes also the second, and occasionally as far back as the fourth, contain only the transparent part of the animal; beyond this, the cells are filled with two large organs differently coloured. One and the principal is an alimentary canal, thick, gray, greenish, which, like the whole of the body, is articulated; this extends itself from chamber to chamber, and its divisions are united by an œsophagus or siphon. When the shell is removed by acid, the siliceous carapaces of Infusoria which the animal has swallowed may be observed (in *Nonionina* and *Geoponus*) as far back even as the last articulation of the alimentary canal. The structure of this canal,

* Séance Juin 11, 1836.

† *Ibid*, séance de 16 Janvier 1840. L'Institut, No. 350, Sept. 1840, p. 309.

‡ Acad. Roy. des Sc. Berlin, séance de 16 Janvier 1840. Vide l'Institut, No. 350, Sept. 1840, p. 309.

§ *Ibid* [and Taylor's Scientific Memoirs, vol. iii. p. 342].

is not polygastric but simple ; expanded in the articulations, and possessed of a single aperture, which is situated anteriorly. In *Nonionina* the articulations are distinct, and connected by one siphon ; in *Geoponus* they are multiple, and each set connected by its proper siphon.'

" Independently of the alimentary canal, a horny brown yellowish mass is seen in every articulation of the spine, the first excepted : this, which is granular, Ehrenberg considers to be the ovary.

" In searching for a purely negative character, Ehrenberg states that it consists in the want of pulsatory vessels ; that while he has always recognized pulsations in the Mollusca and the smallest aggregated or compound Ascidia, he could never do so in *Nonionina* and *Geoponus*, the two species of Polythalamia (Foraminifera) which he more particularly examined.*"—*Jour. Bombay Br. As. Soc.* vol. iii. pt. 1, p. 158.

This is all that had been discovered up to the time of my compiling this paper. I had seen the filamentous prolongations myself, and, on dissolving off the shell of a species of *Robulina* (D'Orbigny), had found a brown mass occupying the chambers (as it then appeared to me) in loops, in the largest or last formed ones, and diminishing posteriorly ; it was also constricted at each end of the loop by the narrow aperture in the septum, and thus beadded, as it were, posteriorly, where there were no longer any loops, but a simple dilatation of the substance of each chamber. I will not now vouch for the complete accuracy of these observations, for they were made on board ship, with a simple lens and under considerable disadvantages ; and other people have not since described the internal substance of the chambers as occurring in loops, nor have I since seen it in this form myself.

About the time I wrote this paper, MM. Joly and Leymerie were engaged in the microscopical examination of Nummulites, and the results of their investigations were made known through the 'Comptes Rendus' on the 24th Oct. 1847. Meanwhile, too, Dr. Carpenter examined the fossilized remains of Foraminifera generally, and his communication on the subject was read before the Geological Society of London, 2nd May 1849, together with some extracts from Mr. Williamson's description of the animal and shell of *Polystomella crispa* (Trans. Microscop. Soc. vol. ii. p. 159), which I shall here insert, with Dr. Carpenter's remarks, as the whole appears in the 'Quart. Journ. Geol. Soc.' vol. vi. pt. 1, p. 28, for I have not Mr. Williamson's paper to refer to :—

"Of the contained animal itself, which he obtained by dissolving

* Acad. Roy. des Sc. Berlin, séance de 16 Janvier 1840, and Scientific Memoirs, Parts X. and XI.

away the calcareous matter of the shell with dilute acid, Mr. Williamson says, that it consisted 'of a very thin external membrane filled with gelatinous matter.' 'No trace of minute internal organization, such as a specially located intestinal canal, or ovaries, could be detected by Mr. Williamson'; nor was he able in any instance 'to discover with certainty the presence of any foreign bodies in their interior.' The several segments are described by him as connected by a series of prolongations, which pass through the septa near their inner margins. The segments at first formed have only single connecting necks; but the number of these soon increases, and the outer segments are connected by ten or more such necks, which pass through as many distinct orifices in the septa. If all these orifices were brought together on the central plane, so as to coalesce into one, they would exactly correspond with the single perforations in the septa of Nummulites. The animal of *Polystomella* is considered by Mr. Williamson to derive its nutriment from pseudopodia, which are projected through numerous minute apertures over the whole surface of the shell. He has not clearly traced these pseudopodia, however, into connection with the segments occupying the interior whorls, which, like those of Nummulites, are invested by those of later formation; but he mentions (as Ehrenberg had done) that near the umbilicus they are projected in fasciculi; and he states that the surface of the central calcareous nucleus (which is formed by a thickening of the walls of the smallest cells) is pitted by small but deep depressions, which may be designed to facilitate the exit of the pseudopodia from the innermost convolutions. Mr. Williamson goes on to point out, that to these pseudopodia must be attributed the deposition of new matter upon that portion of the central nucleus which is not covered by the investing whorls; and in this view he is in accordance with M. D'Orbigny, who, in his recent work, 'Sur les Foraminifères Fossiles du Bassin Tertiaire de Vienne,' fully recognizes the power of the pseudopodia to secrete the calcareous covering. I may remark, that I cannot see how the investing layers covering the disk of *Nummulites complanata*, and the other species of the same group, can be formed in any other way; since in these the chambers are only marginal, the segments of the animal not extending over the disk; and we have no reason to believe in the existence of any external mantle, spreading over the whole surface, whereby these investing layers could be formed."

We now come to the structure of the shells, to which, of all others, both in description and illustrations, Dr. Carpenter appears to me to have contributed most.

MM. Joly and Leymerie seem to have gone no further than to have shown, that in fossil Nummulites exist hemispherical granulations or little circular depressions, corresponding to granulations both on the external and internal surface of the shell, and that these are nothing more than perforations with which the shell was pierced during the existence of the animal. Also, that there existed a similunar hole in each septum arching over the margin of the preceding whorl, and that the rest of the partition was imperforate. (Mém. sur les Nummulites, Sect. B. p. 20.)

Dr. Carpenter, however, whose investigations were carried on independently of those of MM. Joly and Leymerie, has gone much further than this, and therefore it will be as well to give a short summary of all that he has observed.

Commencing with the septa, he states *(loc. cit.)* that each consists of two layers, by which every chamber has its own proper wall, and that the intervening portion, which he terms the "*interseptal space*," "must have been vacant in the recent shell, unless occupied by the soft parts of the animal itself;"—"that each septum is perforated by an aperture, close to its junction with the margin of the preceding whorl" (as he believes was first observed by D'Orbigny, and figured first by Mr. Sowerby); and, "that these perforations pass through *both* layers of each septum, so as to establish a free communication between one chamber and another." That this case is different, however, "with regard to certain more minute apertures, which may be seen by a careful examination, under a sufficient magnifying power, to exist on the surface of every septum, though not consistent either in number or position"; "they penetrate that layer only of the septum on whose surface they open," "and establish a communication between each chamber and the adjoining interseptal spaces." "Other apertures of the same kind may be generally traced, on careful examination, in the walls of the chambers that form the surface of the whorl; and these too appear to communicate with the interseptal spaces by channels burrowed into those walls."

"Thus the cavity of each chamber communicates with that of the one before and behind it in the same whorl, by the large aperture first mentioned, which frequently appears as if made up by the coalescence of a number of smaller perforations (fig. 7 *b*.), suggesting the idea that the animal substance which originally passed through it was not a single large canal, but was composed of a bundle of minute tubes or threads. This idea is confirmed by the circumstance, that the outer margin of the included whorl (fig. 7 *c*.) frequently presents a series of furrows,

corresponding to the notches at the inner edge of the septum (*b*). Each cavity also communicates freely with the interseptal spaces on either side by the smaller apertures and passages last described; and from this space, as we shall presently see, there was a free passage to the external surface of the shell.

"The texture of the shell itself differs remarkably from that of any of the Mollusca with which I am acquainted, approaching that which I have described in the common Crab (Reports of the British Association, 1847, p. 129). It is everywhere perforated by a series of tubes of extreme minuteness which pass directly from one surface to another, their openings being plainly visible on each (fig. 16). The diameter of these tubes is about 1–7,500th of an inch, and their distance from each other about 1–15,000th. In a thin vertical section of the shell (fig. 15) they are seen to run parallel to each other, and to be free from sinuosities or interruptions. The whole of this portion of the shell, therefore, is minutely porous. The structure in question can be seldom clearly distinguished in those Nummulites which have had their texture altered by calcareous or siliceous infiltration; but as the appearances which these present correspond closely with those exhibited by specimens of *N. lævigata* which have been subjected to the same change, I have no doubt that the tubular structure in question is common to the whole group." "All the Nummulites which I have examined present a remarkable departure from this structure in that portion of the shell which forms the margin of each whorl. Here, instead of an assemblage of minute, closely-set, parallel tubuli, we have a much coarser arrangement, the solid substance being perforated with a smaller number of tubes of two or three times the diameter of those last mentioned, which pass in a radiating manner from the inner to the outer surface. Some indications of this difference are seen in fig. 4; but it is much more clearly displayed at *b*, *b*, fig. 15, which represents a portion of a very thin section taken in the same direction, and viewed by transmitted light. The openings of these tubes on the outer margin of the whorl are not readily discernible, partly in consequence of the somewhat oblique direction of the orifices, and partly through these being usually covered with a calcareous incrustation. When this has been removed by the application of dilute acid they are easily seen when properly looked for, as was first pointed out to me by Mr. J. Morris."

Lastly, Dr. Carpenter has observed, in addition to the tubes which run from the punctations on the surface into the chambers of the Nummulite, another "series of perforations of considerable size, which pass directly downwards from the exterior, through the superposed

investing layers of the successive whorls, however numerous, until they reach the floor and chambers of the central plane, which they do *not* penetrate." These, he feels satisfied, " always terminate *over the septa*, and actually pass into the *interseptal* spaces."

Now let us see how far these statements are confirmed by the structure of the shells of *Operculina Arabica*. These were obtained in the following way :—

While medical officer on the survey of the south-east coast of Arabia, I observed that Foraminifera were frequently brought up on the grease of the ship's sounding lead, and after this I obtained the loan of a lead, which I used to cast for this particular purpose myself. They were found to be most numerous in about 10 to 20 fathoms of water, rather in sandy than in muddy bottoms, scanty in deep water, and never (by the lead) among rocks and coral-ground. In one bed passed over, which was several miles in diameter, in about 20 fathoms of water, and about six miles off shore, the grease of the sounding-lead came up covered with them at each throw ; they were the largest living specimens I have ever seen, and principally consisted of the genus *Operculina* (D'Orbig.), *Discorbis* (Lam.). Most measured from 2 to 3-12ths of an inch in horizontal diameter, and one or two 3-10ths. Some contained animals, and others were empty ; the latter were readily distinguished from the former by their pearly whiteness ; while those which contained animals were invariably covered with a thin greenish cuticle like the deciduous epidermis of shells generally.

The following is a description of this *Operculina*, which, as it is most probably a new species, I have designated by the specific name of " *Arabica*."

Operculina Arabica (H. J. C.).

Description.—Free, equilateral, oval or discoidal, thin, flat or wavy ; formed of one spire increasing gradually, not embracing ; regular, equally apparent on both sides ; consisting of 3–4 whorls, contiguous, enlarged on the outer border. Chambers numerous, 1–75, narrow, apparent on both sides, increasing gradually in length and breadth from a semitransparent, prominent, central cell ; radiating, reflected in their outer third to a point, particularly in the last-formed whorl ; divided by semitransparent septa, and covered externally with a green substance like the epidermis of shells generally. Intercameral communications numerous in the septa of the last-formed whorl, the largest long, narrow, and crescentic, arching over the margin of the preceding whorl.

Dimensions.—1–6th of an inch in horizontal, and 1–96th in vertical diameter ; widest part of last whorl 1–24th of an inch (Pl. IV. fig. 1).

Observations.—This description is chiefly taken from one of the largest and most regularly formed shells I possess. They are by no means always plane, but, on the contrary, frequently wavy, like Nummulites ; and the chambers sometimes increase in size more rapidly than at others, causing the shell to assume a more or less elongated or oval form ; the chambers are also sometimes broader, sometimes narrower ; and occasionally a septum only extends part of the way out towards the margin of the whorl, when it suddenly bends backwards to meet the preceding one, or it may stop short altogether, and then the chamber behind and before it coalesce at their outer parts. Irregularities of this kind in the formation of the chambers of Foraminifera are not at all uncommon, and apparently so usual in *Nummulites lævigata,* that they would seem to constitute a character. The imperfectly developed chamber extending from the margin of the foregoing whorl outwards instead of in the opposite direction, seems to point out the course in which the chambers are formed ; and if each chamber is to be regarded only as the full development of a single animal, the imperfect one must be considered as an abortion, and those which have coalesced as a monstrosity. Most frequently there is here and there a large opening in the shell, over one or more of the chambers, which leads into the latter ; they are more or less round, larger or smaller, and the smoothness of their margin would seem to indicate that they had been formed by the animal itself, if not by some other animal.

Microscopic Examination.—The chambers of the shell, after the green cuticular substance has been removed, are found to be covered externally with large and small papillæ ; the former 1–2,150th, the latter 1–8,600th of an inch in diameter (fig. 2). The former also are about twice their own breadth apart, and the latter occupy the intervals between them ; both are confined to the areæ over the chambers ; they do not appear over the septa nor on the margin of the shell. The large papillæ appear to be imperforate, while the small ones appear to present each a puncture in the centre. The septal spaces, as well as the central cell, are semitransparent, and the former have a single, beaded line of semitransparent papillæ along their course.

The internal surface of the chambers merely presents the small papillæ with their puncta ; there are no large papillæ on it, and their cavities are otherwise complete, with the exception of the channels of intercameral communication, and some minute vascular apertures which will be presently mentioned.

The septa (fig. 5 *b*, *b*) occupy, transversely, about 1–6th of the breadth of the chambers, and each septum incloses within its walls two calcareous tubes or vessels, one on each side, some little distance below the contiguous surface of the shell (fig. 7 *a*, *a*); these we shall call *interseptal vessels*. They are irregular both in their size and course, though generally about 1–1,900th of an inch in diameter, in the last-formed septa of a shell having the dimensions of the one described, and diminish in calibre backwards or towards the first-formed whorls. Each vessel commences in the centre of an intricate network of smaller ones, spread over its own side of the margin of the preceding whorl, and under the layers of the shell (*f*, *f*, *f*); these networks, which are joined together, we shall call the *marginal plexus*. In its course each interseptal vessel gives off two sets of *ramusculi*, and the marginal plexus one set. Of those coming from the interseptal vessel, one set terminates on the surface of the shell, particularly about the borders of the septum (*d*, *d*); the other goes into the walls of the shell, and through the septum, to open probably on the inner surface of the chamber (*e*, *e*, *e*); while the set from the marginal plexus opens on the margin (*g*, *g*, *g*). As this vascular system appears to extend throughout every part of the shell, and must be for the circulation of some fluid, we will call it the *interseptal circulation*. It would have been more proper to have commenced with the *ramusculi*, as we shall see hereafter that they appear to absorb the fluid which is subsequently transmitted into the larger vessels, but at this period of our description it would not have been so intelligible.

We have now to examine the internal structure of the shell, and commencing with that part forming the walls of the chambers, we observe that it is pierced by innumerable tubes, which pass directly downwards from the small papillæ on the external, to the small papillæ on the internal, surface of the chambers (fig. 3 *d*, *d*). I could see no tubes passing down from the large papillæ, which I have before stated to appear imperforate, like those over the septal spaces. These tubes are about 1–9,000th of an inch in diameter, and about the same distance apart; they are vertical over the centre of the area of the chamber, and slope outwards at its boundaries, but do not pass through or extend over the margin of the shell, neither over the septal spaces, nor over the central cell; hence the semitransparency of the two latter, and the fringy, beaded appearance which the tubes present at these parts, particularly around the central cell, where they assume the form of rays.

Besides these tubes, a vertical section of the shell presents a series of horizontal lines 7–8 or more in number, parallel to each other, but

not equidistant (fig. 3 *c*, *c*); these appear to be the lines of contact of the layers of which the shell is composed.

Lastly, we come to the margin, which exhibits a very curious and interesting structure. It is almost entirely composed of calcareous *spicula*, arranged parallel to, but overlapping each other (fig. 4). These spicula are 1–237th inch long, and 1–900th of an inch broad, transparent, apparently hollow, and pointed at each extremity; they appear to be straight, although, from their position, one would be inclined to think that they must be a little curved. When a transverse section is made of the margin, we observe that it consists of upwards of 100 of these spicula, which form a triangular bundle or cord (fig. 6 *a*), the apex of which is directed inwards or towards the chambers, and the base (*a*) outwards to form the free, rounded margin of the shell: while its sides are overlapped by an extension of the walls of the chambers, which open as it were to receive it. Its base presents a regularly wavy outline (when viewed in the transverse section) from the longitudinal arrangement of the spicula, which do not appear to be covered by a layer of the shell; and parallel to its sides run the papillary tubes of the chambers (*b*), becoming more vertical as they increase in distance from this position; while towards its apex appear the divided large vessels of the marginal plexus (*c*). In the transverse section also, when reduced to a thin layer, transparent intervals appear in the form of zigzag lines radiating from the apex to the circumference of the cord, which would seem to indicate that the spicula were arranged in it in more or less horizontal planes, dipping towards the apex.

It will naturally now be asked, how this spicular cord (fig. 5 *h*, *h*), which commences with the first cell, terminates; but I regret that there is not a single specimen in my possession to afford the information. This arises probably from the extreme thinness of the last-formed chamber; for with the two or three preceding ones, it is almost always broken or absent. All I can state in connection with this is, that there are always more or less vessels of the marginal plexus cut through or broken in a transverse section or fracture of the spicular cord, and frequently a large one close to its apex, which after the shell has been filled with a solution of carmine, and then laid in pure water, purges it almost completely from the colouring matter with which it had been filled; a broken interseptal vessel will also do this. Hence it is not impossible, that a natural opening of the kind may exist at the termination of the spicular cord, for this purpose; but, then, it has nothing to do with the spicular cord itself, of the natural termination and uses of which I am equally ignorant. It should here also be mentioned,

that when a thoroughly empty shell, which may be known by its pearly whiteness, is gently laid on the surface of a solution of carmine, so as to float there, the latter is seen, first to colour the margin, then the interseptal vessels become filled, and lastly the *walls* of the chambers; none of the semitransparent parts of the shell become coloured. This will take place sometimes in a few hours, but with some shells it requires a day or two for its completion. By keeping one side of the shell dry the air is enabled to pass out of it, while the solution enters the depending side, and in this way the whole of the hollow structure of the shell becomes coloured. When the shell is washed and dried in this state, the carmine is seen to be chiefly in the interseptal vessels, and this is perhaps the best way of tracing out the terminations, or rather origins, of the *ramusculi*. On the other hand, when the shell is placed in pure water, and watched with a magnifying glass, a stream of carmine particles will be seen slowly issuing from the vessels of the marginal plexus, at the broken end of the spicular cord, or from any other part of the large whorls, where an interseptal vessel may have been broken; and after a time, according with that which the shell has taken to imbibe the colouring matter, it will become perfectly white again. Whether this be owing to the watery distension of the gummy fluid suspending the carmine, or a natural consequence of the structure of the shell itself, further observation must determine. The fact of the carmine accumulating at the orifices of the *ramusculi*, as it would in a filter, seems also, with what has just been stated, to point out the course of circulation in them; and if we may be allowed to carry out the analogy still further, which is now seen to exist so strikingly between Foraminifera and Porifera, we might compare the interseptal circulation in the former to the aqueous circulation in the latter, and thence might infer that the water entered by the *ramusculi* or small pores, and came out by the larger ones, gathered together into one vessel, opening in its natural state at the end of the spicular cord; but until a perfect specimen be obtained to determine this, all must of course remain conjectural.

Growth.—From what I have stated respecting the existence of a substance, resembling the cuticle of shells, over the external surface of *Operculina Arabica*, and the presence of innumerable puncta, which appear to be connected by tubular communications with the chambers beneath, it is not unreasonable to infer, that by this arrangement successive additions may be made to the external surface of the shell, and the laminated structure, which it presents on a vertical section, thus formed; while the addition of chambers would appear to com-

mence from the opening in the septum close to the preceding whorl, and an interseptal vessel, arising, as before described, from its marginal plexus, to extend outwards, on either side, *pari passu* with the chambers to the circumference, which it may fall short of or not, as already stated. Again, it would appear that this addition does not take place singly, but that there are always two or more chambers (fig. 8 *b*, *b*, *b*,) in process of formation, the last being the smallest, and that, one after another, they gradually reach the margin. I have come to this opinion, not from the recent specimens of *Operculina* in my possession, in which, as before stated, all the last-formed chambers are broken, but from having observed the ochraceous casts of microscopic nautiloid species of Foraminifera which have been fossilized, to present this form, when dissolved out from their matrix.

Analogy to Porifera.—When Dujardin, guided by the suggestion of Bory St. Vincent, was struck with the analogy which exists between the filamentous prolongations of Foraminifera and those of the *Amœba* or *Proteus*, he could have little thought, that however nearly the latter might be allied to the Sponges, the former would be found so similar to them in their compact structures. Who, indeed, looking at the nautiloid form of a foraminiferous shell, and an amorphus piece of sponge, would say that they bore the least resemblance to each other? Yet they are, as we have seen, most intimately allied, both in their fleshy and their compact structures. It must be now generally allowed, that the rhizopodous nature of Foraminifera is identical with that of the *Amœba* or *Proteus*, and through the latter with the sponge-cell; and in addition to this, we have the former, at least the genus *Operculina*, still more nearly allying Foraminifera to the Sponges, by possessing a spicular structure, if not a circulating system also, like that of sponges. It is curious, too, that without any reference to the use of the pores in these two orders of animals, they should have received names of the same signification, as if the intimate relationship which is now found to exist between them was instinctively anticipated before it was proved by demonstration. The genus of Porifera to which *Operculina* comes nearest is, of course, the calci-sponges, that called *Grantia*, after their distinguished discoverer Dr. Grant; and of this genus it would seem to approach nearest to the tubular species, which have but one vent.

Structure of the Shell of Operculina compared with Nummulites.—It will be very gratifying to those whose investigations of the structure of Nummulites must have been attended with so much labour, difficulty, and doubt, to see how satisfactory the examination of a

recent foraminiferous shell, so nearly allied to *Nummulites* as that of *Operculina*, confirms and elucidates their observations. The vertical tubes passing from the surface of the shell to the interior of the chambers (see Dr. Carpenter's illustrations, fig. 15, *loc cit.)* ; the intercameral communication (*id.* fig. 7 *b*) ; the linear markings or grooves immediately under the latter (*id.* fig. 7 *c*), which appear to have been produced by the previous existence of a spicular cord in this position ; and the radiating lines (*id.* fig. 15 *b*, *b*), caused by the arrangement of the spicula in horizontal layers inclined towards the apex of the cord, with the sloping papillary tubes on each side of it.—The " minute apertures" (*id.* fig. 7 *a*), which only penetrate *one* layer of the septum, and others which open on the internal surface of the walls, are probably the orifices of the *ramusculi* of the interseptal vessels which go in this direction.—And the " perforations of considerable size, which pass directly downwards from the exterior through the superposed investing layers of the successive whorls" " until they reach the floor of the chambers of the central plane, which they do not penetrate" (*id.* fig. 8 *a*) ;—the vertical interseptal vessels, or an enlargement and union into one tube of the *ramusculi*, which pass upwards and downwards from the horizontal interseptal vessels as seen in *Operculina*.

The latter, that is, the union of the vertical with the horizontal interseptal vessels, I have been able to make out in some specimens of *Nummulites acuta*, Sow. (Geol. Trans. 2nd Ser. vol. v. pl. 24, fig. 15), which have had their cavities thoroughly infiltrated with ochraceous oxide of iron ; as well as everything else mentioned by Dr. Carpenter ; and, with the exception of the spicula themselves, everything that I have seen in *Operculina*. MM. Jolly and Leymerie seem to me to have described one thing, and to have figured another. They describe the papillary tubes, and seem, from the distance between them, to figure the orifices of the vertical interseptal vessels (pl. 11 *op. cit.*), which Dr. Carpenter has particularly described.

The columns represented by Sowerby in *Lycophrys ephippium* (Geol. Trans. *loc. cit.* fig. 15), and to which Dr. Carpenter has alluded (*loc. cit.* p. 26), appear to me to be made up of the papillary tubes which descend from chamber to chamber (fig. 9 *g*, *g*), and which in purely calcareous fossils are filled with a white opaque matter, but in those infiltrated with oxide of iron, with ochraceous matter ; while the intervening parts are composed of the septal substance, through which the interseptal vessels pass to the surface and margin in *Orbitoides* as well as in *Nummulites*.

The same system of circulation would also appear to be carried on in

Orbitolites, where the mass is made up of spheroid or ovoidal cells: for if the nearly flat Scindian species, which has a papillary eminence in the centre of the convex side, be rubbed down, the latter presents a ramification of transparent substance like that filling the septal spaces of *Nummulites* and *Orbitoides*; which, radiating upwards and outwards from this eminence, passes into the general structure of the shell.

The transitionary forms of the chambers in *Operculina*, through *Nummulites* and *Orbitoides*, to *Orbitolites*, would, when viewed in a vertical section, appear to be thus:—In *Operculina* there is a single plane of spear-head shaped chambers; in *Nummulites* a central plane of conical chambers, with layers of compressed ones above and below it; in *Orbitoides*, a central plane of quadrangular chambers, with numerous layers of compressed ones above and below it; and in *Orbitolites*, a mass of circular or ovoidal cells more or less definitely arranged. Hence, if these be their respective peculiarities, *Orbitoides Mantelli* will, from Dr. Carpenter's illustration (fig. 31, *loc. cit.*), belong to the latter, and would therefore be now more properly named *Orbitolites Mantelli*.

One other observation I would here make with reference to geology, viz. the natural union which now seems to be pointed out between the Chalk and the Nummulitic series, by the great prevalence of the same class of animal remains in each—that is to say, the abundance of flints which indicate the previous existence of *siliceous sponges* in the former, and the myriads of Foraminifera, which are closely allied to the *calci-sponges* in the latter.

EXPLANATION OF PLATE XVIII.

Fig. 1. *Operculina Arabica*; natural size.

Fig. 2. Large and small papillæ on the external surface of the shell, highly magnified.

Fig. 3. Vertical section of the shell over the chambers, highly magnified, showing:—*a*, *a*, large papillæ; *b*, *b*, small ditto; *c*, *c*, horizontal lines indicative of the layers of the shell; *d*, *d*, vertical tubes.

Fig. 4. Spicula *in situ*, highly magnified.

Fig. 5. Diagram of horizontal section of three large chambers of the shell, showing the interseptal vascular system and spicular cord: *a*, *a*, *a*, chambers; *b*, *b*, *b*, septa; *c*, *c*, *c*, interseptal vessels; *d*, *d*, *d*, *ramusculi* coming to the surface of the shell; *e*, *e*, *e*, ditto, going to the walls of the shell, &c. through the septa, the dotted lines indicating those branching out into the former; *f*, *f*, *f*, marginal plexus; *g*, *g*, *g*, *ramusculi* of margin; *h*, *h*, spicular cord; *i*, half-formed septum, with termination of interseptal vessel.

Fig. 6. Diagram of vertical section of the shell to show the form of the spicular cord : *a*, margin or free surface of spicular cord ; *b*, vertical or papillary tubes, here sloping outwards on each side the cord ; *c*, truncated vessels of the marginal plexus ; *d*, *d*, small channels of intercameral communication ; *e*, grand semilunar or crescentic channel of ditto ; *f*, septum.

Fig. 7. Diagram of vertical section to show the situation of the interseptal vessels ; *a*, *a*, interseptal vessels ; *b*, septum ; *c*, grand channel of intercameral communication ; *d*, part of spicular cord.

Fig. 8. Enlarged view of first-formed chambers of *Operculina Arabica* : *a*, central cell or chamber ; *b*, *b*, *b*, probable forms of last chambers in process of development.

Fig. 9. Diagram of vertical section of *Nummulites acuta*, Sow. : *a*, spicular cord ? ; *b*, truncated vessels of marginal plexus ; *c*, *c*, chambers of central plane ; *d*, *d*, vertical interseptal vessels (the " perforations," &c. of Dr. Carpenter) ; *e*, *e*, horizontal interseptal vessels ; *f*, *f*, *f*, chambers on each side the central plane ; *g*, *g*, *g*, vertical tubes.

Art. VI.—*Note on the Pliocene Deposits of the Shores of the Arabian Sea.* By H. J. Carter, Esq., Assistant Surgeon, Bombay Establishment.

Presented October 1852.

This note had reference more particularly to Major Turner's specimens of the strata from the neighbourhood of the harbour at Kurrachee.

The author stated that the geological interest which attached to them arose from their similarity to other deposits which existed throughout the whole Western Coast of India, and were found also, in part, on the South-Eastern Coast of Arabia, and on the African coast and islands opposite. These were the last raised portions of the shores of the Arabian Sea, and seemed to be the only step on to the trap of Western India, to the " tertiary" deposit in the southern part of Cutch mentioned by Colonel Grant, (*Geol. Trans.* 4to, 2nd series, vol. v. p. 302,) and to that mentioned by the author himself on the SE. Coast of Arabia. (This vol. p. 93, Group 2nd.) General Cullen had presented to the Society, through

Dr. Buist, specimens of blue clay and lignite which extend between Cannanore and Cape Comorin. Major Fulljames had witnessed the same kind of clay with lignite in boring for water at Gogo, in the Gulf of Cambay; the Society's museum contained abundance of a similar kind from the island of Bombay; and now Major Turner had forwarded the same from Kurrachee.

This clay was covered at each place by a variable conglomerate ("Miliolitic Deposit," see description of, this vol. p. 94, Group 3rd), formed of the detritus of the surrounding rocks, together with sea-sand and shells. Thus, while the clay, from the minuteness of its particles, appeared to be the same throughout, it might reasonably be inferred to differ just as much in mineralogical composition as the conglomerate which superposed it at the different localities mentioned, both having been more or less derived from the same sources. About Cannanore it appeared to consist of the detritus of the laterite and trappean rocks; at Kurrachee of that from the older limestone rocks and sandstone of the neighbourhood, and at Bombay of the trap rocks; while at Gogo it seemed, in addition, to have the remarkable ossiferous conglomerate, probably brought down by the rivers emptying themselves into the Gulf of Cambay.

The conglomerate, or miliolitic deposit, was the one common on the coasts of Arabia and Africa mentioned, existing in the former sometimes but a few feet above the sea, at others in portions on the scarps of the cliffs some hundreds of feet above it, and at others in extended tracts, reaching some miles inland. The author considered the Poorbunder stone to be part of the same deposit, and the so-called "gold sandstone" found in the creeks along the coast of Cutch to be identical with the latter. The golden lustre about the particles appeared to be yellow ochre, interlaminated with the nacreous layers of the fossilized foraminiferous shells, of which it is principally composed; unless it might be pyrites,—iron, both in the state of an oxide and a sulphuret, having a great tendency to locate itself in the cavities of these minute shells, insomuch that on one part of the Southern Coast of Arabia, where the formation of the coast was entirely composed of the miliolitic deposit, in a fine state, and upwards of 200 (?) thick, with a cliff upon the sea—the beach beneath (composed of the detritus of the latter) in one part, presented a black patch, consisting of hardly anything else but the particles of oxide of iron, which had been washed out from the lighter and more fragile parts of the foraminiferous shells in which they had been deposited.

That this deposit extended a considerable distance inland in some parts might be seen from its forming the south-eastern extremity of

the great desert of Akhāf, on the South-east Coast of Arabia. (This vol. pp. 33, 34.) It also existed in a "creek nine miles north" of the town of Bhooj in Cutch, from whence Major Le G. Jacob had sent portions of the so-called "gold-stone" to the Government; and there were portions of miliolite* (red and yellow) in the Society's museum, which had been presented by the late Lieutenant Blake, from the town of Mandu, under the Vindhya Range, 140 miles up the valley of the Nurbudda; while Major Fulljames had just forwarded to the Society specimens of orbitoliferous limestone from the western spurs of the Rajpeepla Range, on the southern side of the Nurbudda, which belonged either to the nummulitic or tertiary formations (Grant) of Cutch. The sea, therefore, extended much further up the Nurbudda formerly than it does at the present time, and here, where these fossiliferous rocks come in contact with the trap of India, the different geological ages of the latter might, perhaps, receive some elucidation.

It was difficult to say to what geological age the lowest part of the blue clay belonged. Major Fulljames states, in his interesting observations in the 1st volume of the Society's Journal, that after conglomerate and sand had been bored through to the extent of 35 feet at Gogo, the blue clay was met with; and although the boring was carried on 360 feet, it was "never passed through." Major Turner mentions a similar account of a bore at Kurrachee. Until, therefore, sufficient fossils had been collected from these deposits, to ascertain how many of their representatives now existed in a living state, their real geological age could not be determined.

There was an interesting fact also connected with the quantity of mineral copal which is found with the lignite mentioned, on part of the Malabar Coast, viz. that Dr. Vaughan had stated† upon good authority, that the fine copal which is brought to Bombay from Africa is dug up at a considerable distance below the surface of the ground from the African coast opposite Zanzibar, by Sidis employed by the Imaum of Muscat, who claims this produce. The co-existence of the same kind of mineral resin on both sides of the Indian Ocean is not less remarkable than that the beautiful copal, hitherto conjectured

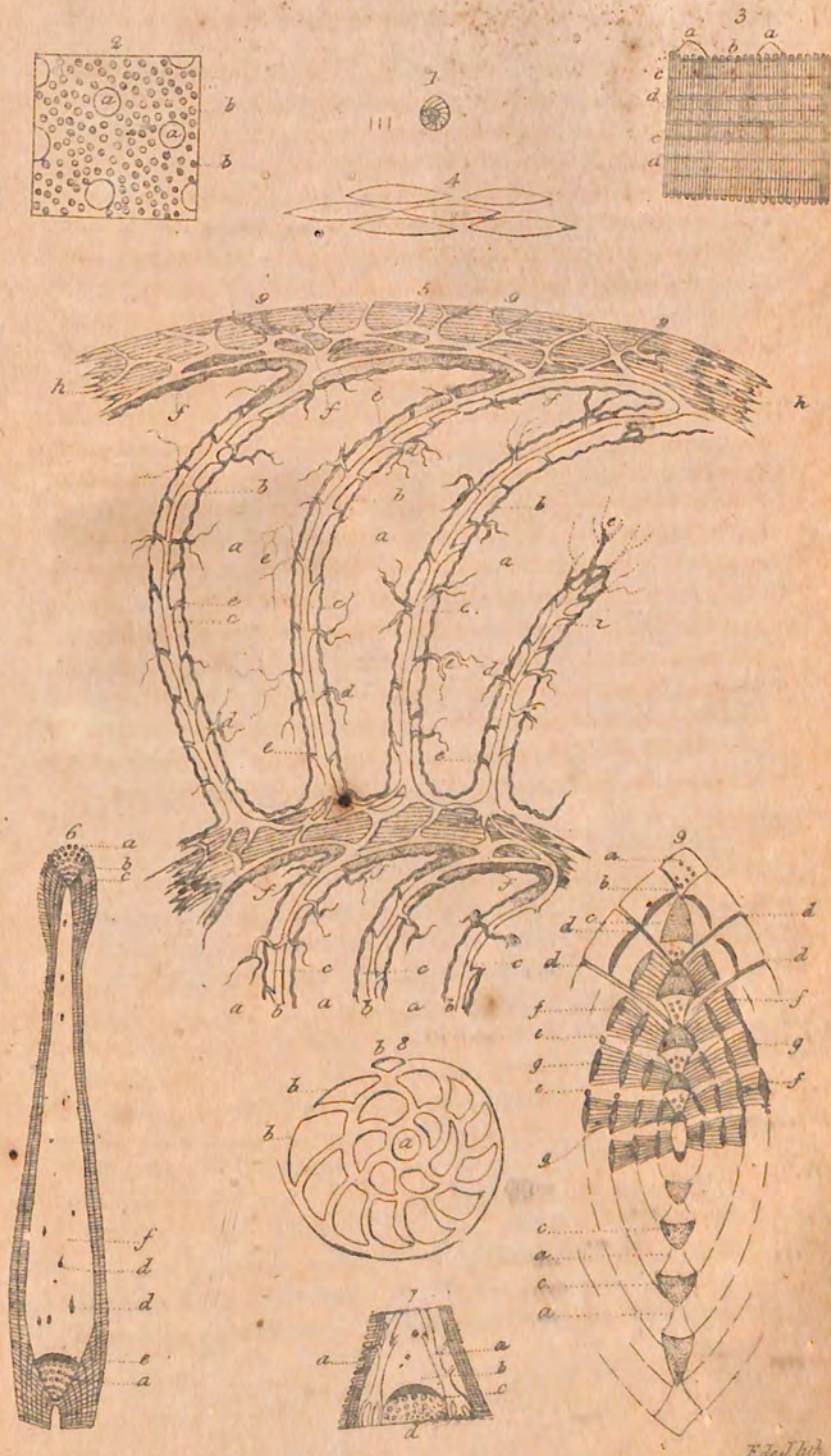
* At first, this rock looks anything but fossiliferous, and it is not until portions of it have been polished, and exposed to the action of weak acid and water, that its real structure becomes evident. It is then found to abound, among other organic remains, with a microscopic coral, which resembles *Favosites* in miniature, in the section, and is sometimes branched. To what formation this miliolite belongs future observation must determine.

† Trans. Med. and Phys. Soc. Bombay, No. I. New Series, Appendix No. 1.

to be the exudation of a living tree in Africa, should be dug out of the ground, and perhaps from a blue mud or clay like that imbedding a similar material on the Malabar Coast.

Another circumstance worthy of consideration was, whether this blue clay or mud had not followed the effusions of trap, while the great sandstone formation of Cutch and India had been connected in like manner with the decomposition of the granite rocks. In this case the lowest part of the clay would be coeval with the first effusions of trap, and *vice versâ*.

The conglomerate or miliolitic deposit in some parts existed without the clay, and sometimes below certain deposits of it. At Bombay there was in some parts a calcareous sandstone under the blue clay, like the miliolite of Poorbunder, in Khattyawar. Thus some of the conglomerate, or miliolitic deposit, might be older, and some younger than the blue clay; the former, when very fine, being almost entirely composed of the calcareous remains of microscopic foraminifera, and therefore almost wholly marine in origin; while the latter, being chiefly the detritus of decomposing rocks on shore, brought down by the rains, was almost wholly of terrestrial origin. Again, the clay itself might be mixed with more or less calcareous matter from the sea and elsewhere, so as to form an impure or argillaceous limestone, like that of the Malabar Coast. In all the specimens of the clay that the author had seen from the localities mentioned, the calcareous matter of the shells was more or less white and pulverulent; the animal matter gone, and the lime beginning to assume a crystalline arrangement.



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ART. VII.—*Extracts from the Proceedings of the Society for the Year* 1851–52.

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——Meteorological, made at the Meteorological Bungalow on Dodabetta, for the years 1848—1850, under the directions of the late Messrs. Taylor and Jacob	Govt. of Madras.
——Magnetical and Meteorological Observatory at the Cape of Good Hope, under the superintendence of Lieut. Col. Sabine	Govt. of Bombay.
——at the Bombay Observatory, in the year 1848, under the superintendence of Captain C. W. Montriou, I. N.	———
Operations for the improvement of the Navigation of the Ganges from Ravulgunge to Allahabad, during the season 1849-50	Bd. of Ed. Bom.
O'Shaughnessy (W. B.), Report on the Electric Telegraph between Calcutta and Kedgeree	Govt. of Bombay.
Pershad (Lalla Jottee), Trial of	Govt. of India.
Police, Returns of, showing the State of Crime in the Town and Island of Bombay, during the year 1850-51	Govt. of Bombay.
Proceedings regarding the settlement of a Village, translation of	Bd. of Ed. Bom.
——of a Meeting of the Committee of the Obstetric Institution, Bombay	Dr. Morehead.
Purgstall (Barron Hammar), Literaturgeschichte der Araber. Von ihrerm beginne bis zu Ende des zwolften Jahrhunderts der Hidschret, von. 2 Vols.	The Author.
Pyle (J. C.), Abstract of Meteorological Observations made at Futtegurh, for the year 1850, North-Western Provinces, Bengal.	Col. Sykes.
Raja (B.), Aphorisms of the Yoga Philosophy of Patanjali (Sanskrit and English)	Bd. of Ed. Bom.

	DONORS.
RENNY (Dr. C.), Medical Report on the Mahamurree in Gurhwal, in 1849–50.	Bd. of Ed. Bom.
REPORT of the Board of Education, No. X., for 1851–52.....	Govt. of Bombay.
———Civil Judicial Administration of the Bombay Presidency, for the year 1849–50.....	————
———Fourth Annual, of the Board of Regents of the Smithsonian Institution, for the year 1849.	Smithson. Inst.
———of the Bombay Engineers, for the years 1849–50–51.	Govt. of Bombay.
———Annual, of the Grant Medical College, Bombay, Sixth Year Session, 1851–52	Dr. Morehead.
———of Crime, and of the Police Administration of the Zillahs subject to the Bombay Presidency, for the year 1850.	Govt. of Bombay,
———on East India Affairs, 10 Vols.....	Hon.Sir E.Perry.
———upon the Tea Plantations in the North-Western Provinces	Bd. of Ed. Bom.
———Half Yearly, relative to the management of the Government Dispensaries in the Upper Provinces, from 1st February to 31st July 1841.....	————
———of the Sudder Dewanee Adawlut, North-Western Provinces, on the administration of Civil Justice, 1840-41-42	————
———Nizamut Adawlut, North-Western Provinces, on the administration of Criminal Justice, 1842—1844.	————
———on the settlement of the District of Seharunpore, 1839.....	————
———of the Sudder Board of Revenue, on the Revenue Administration, North-Western Provinces, for the official years 1848-49-50.....	————
———on Projected Canals in the Delhi territory.	————
———Official, on the Provinces of Kumaon, with a Medical Report on the Mahamurree in Gurhwal, in 1849-50. Edited by J. H. Butten.	————
RIG VEDA SANHITA, the Sacred Hymns of the Brahmans, together with the Commentary of Sayanacharya, (edited by Max. Müller) Vol. I.	Col. Waddington.

	Donors.
Royle (Professor J. F.), Lecture XI. on the Arts and Manufactures of India.	Govt. of Bombay.
Rut ya Khuda ki purwardigari us ke talashion ke haqq men	Revd. J. Warren.
Sankhya Philosophy, Lectures on (Sanskrit and English)	Bd. of Ed. Bom.
Selections from the Public Correspondence, from Part III. to XI.	———
Small (J.), Index to the Acts passed by the Legislative Council of India from their commencement in 1834, to the end of the year 1849.	Govt. of Bombay.
Smithsonian Contributions to Knowledge, Vol. II., with Index.	Smithson. Inst.
Society, American, Oriental. Journal of, Vol. II.	The Society.
———China Branch of the Royal Asiatic, Transactions of, Part II., 1848—1850.	———
———Royal Asiatic, of Great Britain and Ireland, Journal of, Part I. of Vol. XIII. and of Vol. XIV.	———
———Syro-Egyptian, Original Papers of, read before the Meeting, Part I. of Vol. I.	Revd. Dr. J. Wilson.
———Bombay Geographical, Transactions of, from September 1850 to June 1852, Vol. X.	The Society.
———Bombay Medical and Physical, Transactions of, Vol. X. (with General Index from No. I. to X.)	———
———Ditto ditto ditto.	Govt. of Bombay.
———Royal Astronomical, Memoirs of, Vol. XX., for 1850-51.	The Society.
———Monthly Notices of Abstracts of Papers and Reports of Proceedings, from November 1850 to June 1851, Vol. XI.	———
———Proceedings of, Nos. 1, 2 of Vol. XII. for 1851, and Nos. 3, 4, 5, of Vol. XII. for 1852, with Supplement No. 9. Vol. XI.	———
——— of Northern Antiquaries at Copenhagen, Proceedings of, for 1852.	———
Statistical Report on the District of Goorgaon, compiled by A. Fraser.	Bd. of Ed. Bom.

	DONORS.
SYLLABUS of a Course of Lectures upon Experimental Philosophy.	Bd. of Ed. Bom.
SYNOPSIS of Science (Sanskrit and English)	———
TAYLOR (W. C.), Ancient and Modern India, Vol. I.	———
TREMENHEERE (Capt. G. B.), Report on the Tin and other Mineral Productions of the Tenasserim Provinces	Govt. of Bombay.
TRESHAM (D.), on Blasting under Water by means of Galvanism.	———
TARKA Sangrahba of Annam Bhatta (Hindi and English)	———
WEBER (Dr. A.), Indische Studien. Beitrage fur die Kunde des Indischen Alterthums. Im vereine mit mehrerm Gelehrten Heransge geben, von...	The Author.
WESTERGAARD (N. L.), Bundehesh, Liber Pehlvicus, e vetustissimo codice Havniensi descripsit, duas inscriptiones Regis Saporis primi adjecit..	———
WIGHT (R.), Icones Plantarum Indiæ Orientalis, Figures of Indian Plants, Part II. Vol. V....	Govt. of Bombay.
WYATT (D.), Series of Illustrations of the choicest specimens produced by every Nation at the Great Exhibition of Works of Industry, 1851. 2 Vols. folio.	———
ZEITSCHRIFT der Deutschen Morgenlandischen Gesellschaft. Heft II. III. IV. fur 1851. Heft I. II. fur 1852.	The Ger. Or. Soc.

FOR THE MUSEUM.

Batrachian Reptile, large, *(Rana ?)* remains of, from the carboniferous shale of Bombay	Dr. A. H. Leith.
Butterflies, species of, (100) from the neighbourhood of Bordeaux	Dr. G. Buist.
Coal, from the freshwater strata near Love-grove, in the Island of Bombay.	Dr. A. H. Leith.
Coal and fossils, specimens of, from the Salt Range on the western side of the Upper Indus ; also fossils from the Nummulitic formation in the same neighbourhood.	Lt. Grounds, I.N.

	Donors.
Calcareous conglomerate, loose sandstone, and blue clay with lignite, shells, and septaria, specimens of, obtained in boring for water near Minora Point, Kurrachee	Major H. B. Turner.
Coins, gold (two) called "Huns," found among the ruins of an old building near Punderpoor.	Dr. Wiehe.
——Ditto (one) ditto ditto	Govt. of Bombay.
Copper Ore from Australia	Major Del Hoste.
Dycolytedonous wood silicified, specimens of, from the neighbourhood of Saugor, Central India	Captain W. T. Nicolls.
Fishes, shells, corals, and rock-specimens, a large collection of, from the Red Sea	Lieut. G. F. Robinson, I. N.
Fossil Nautili, specimens of, from Sindh	Dr. A. H. Leith.
——bone, portion of, from a nullah at Wansura, near Poona	——
Impressions, vegetable, and fossil freshwater shells, specimens of, from the chert and carboniferous shale in the neighbourhood of Kamptee	Dr. Jerdon.
Lycodon aulicus, snake, from Bombay	Mr. Mendoza.
Palm-wood and freshwater shells, specimens of fossilized, from the neighbourhood of Saugor, Central India	Captain W. T. Nicolls.
Physa Prinsepii, from a soapy, gritty, deposit near Saugor, Central India	——
Nummulites and nummulitic limestones, specimens of, from Sindh	Major H. B. Turner.
Remains taken from a Cairn at the village of Jwargi, near Ferozabad, on the Bhima. These consist of human bones, the bones of reptiles, those of a canine animal, pottery, a spear-head, and the remnants of an iron tripod, with other pieces of articles formed of the same metal.	Capt. M. Taylor.
Rock-specimens and Fossils, from the Island of Bombay, illustrative of its Geology. (See list, p. 211.)	Drs. A. H. Leith & H. J. Carter.
—— from the Southern Maratha Country, collected from the neighbourhood of Dharwar and Belgaum—from the primitive rocks, metamorphic strata and trappean effusions of that locality	Lieut. A. Aytoun.

	DONORS.
Rock-specimens and Fossils (several hundred), from the South-East Coast of Arabia.....	H. J. Carter, Esq.
——— a collection of, from Aden.....	Capt. Montriou, I. N.
Sculpture, specimen of, from the ruins of a temple on the Pownghur, about 28 miles from Baroda.	Lieut. H. Beville.
Sculptured pieces of marble from the ruins in the town of Chowl, in Angria's Colaba.....	E. C. Jones, Esq.
Shell limestone, specimens of, from Bates Island, in the Gulf of Cutch.....	Lieut. Taylor, I. N.
Silurian fossils and minerals, a large collection of, from Wales.....	Captain C. W. Tremenheere.
Cuneiform inscriptions on a slab of gypsum, and on a brick, from the ruins of Nineveh (fine specimens).....	Parry Jones, Esq.
Telingi manuscript on palmyra leaves.....	Govt. of Bombay.

ORIGINAL COMMUNICATIONS.

	COMMUNICATED BY
Barr, (Captain C.,) Report on the Condition, Customs, and Pursuits of the Mangs of the Kolapoor Territories.—11*th November* 1852.(*a*)	Govt. of Bombay.
Carter, (H. J., Esq.,) Geology of the Island of Bombay.—11*th December* 1851. (*b*).....	The Author.
——————On the form and structure of the Shell of Operculina Arabica (new species).—13*th May* 1852. (*c*).	———
——————Note on the Pliocene Deposits of the Shores of the Arabian Sea.—14*th October* 1852. (*d*).....	———
——————On the larger forms of Fossilized Foraminifera in Sindh (with a plate).—11*th November* 1852. (*e*).....	———
McLeod, (J., Esq.,) Sketches and Descriptions of some of the Cartilaginous Fishes inhabiting the sea near Kurrachee.—10*th June* 1852. (*f*)..	H. B. E. Frere, Esq.
Mitchell, (Revd. J. M.,) Recent Investigations in Zend Literature.—12*th February* 1852. (*g*)..	The Author.
Perry, (Hon'ble Sir E.,) On the conflicting views of	

(*a*) See next No. (*b*) p. 161. (*c*) p. 430. (*d*) p. 445.
(*e*) See next No. (*f*) Ditto. (*g*) p. 216.

	COMMUNICATED BY
European Scholars as to the Races inhabiting Polynesia and the Indian Archipelago; and as to the Languages spoken by them.—13*th May* 1852. (*h*).	The Author.
Perry, (Hon'ble Sir E.,) On the Geographical Limits of the principal Languages of India, and the feasibility of establishing English as a *Lingua Franca*.—15*th July* 1852. (*i*).	———
Stevenson, (Revd. J., D.D.,) Theory of the Great Elephanta Cave.—13*th May* 1852. (*k*).....	———
———Translation of a Sanskrit Inscription in the Great Cave at Kenery, in the Island of Salsette.—15*th July* 1852. (*l*)	———
———Comparative Vocabulary of Non-Sanskrit Primitives in the Vernacular Languages of India, Part II.—12*th August* 1852. (*m*)	———
———On the Historical Names and Facts contained in the Kenery Inscriptions.—14*th October* 1852. (*n*)	———
Taylor, (Captain M.,) Notices of Cromlechs, Cairns, and other Ancient Scytho-Druidical Remains in the Principality of Sorapûr, with Plans and Illustrations.—14*th October* 1852. (*o*).....	———
Wilson, (Revd. J., D.D.,) Brief Memorial of the Literary Researches of the late William Erskine, Esq.—15*th July* 1852. (*p*)	———
———Second Memoir on the Cave-Temples, and other Ancient Buddhist, Brahmánical, and Jaina Remains of Western India.—9*th September* 1852. (*q*).....	———

PROCEEDINGS, OFFICIAL, LITERARY, AND SCIENTIFIC.

THE letter from Messrs. Longman and Co., having reference to the reprinting of the *Transactions of the Literary Society*, stating that the copper-plates had been destroyed, and proposing terms for replacing

(*h*) p. 242. (*i*) p. 289. (*k*) p. 261. (*l*) See next No.
(*m*) p. 319. (*n*) See next No. (*o*) p. 380. (*p*) p. 276. (*q*) p. 340.

them with lithographs, &c., was handed over for the consideration of the Committee of Management. It states as follows :—

"The cost of copying the engravings in lithography, independently of the printing, would be about £150 ; and the cost of printing 250 copies of the work, and plates, would be about £350. In this amount the binding is not included, but this would not amount to a great sum."—*8th January* 1852.

Government letter No. 91 of 1852 transmits copies of the Census of the town and island of Bombay, taken by Captain Baynes on the 1st February last, and of the correspondence which passed between Government and the Police Authorities regarding this and the census taken on the 1st May 1849. Also copies of the returns of the census which was taken on the 26th August last. These records are for deposit and reference in the Society's library, and not for publication, as they are not considered trustworthy, but may furnish much useful information on a future occasion, when it may be deemed advisable by Government that another census should be attempted.

Government letter No. 196 of 1852, stating that the employment of Ensign F. P. F. Brett, of the 11th Regiment N. I., to take fac-similes and impressions of the cave-temple and rock inscriptions in Western India, had been sanctioned by the Supreme Government of India, for one year, and that instructions would be given from the Military Department for placing Mr. Brett's services at the disposal of the Cave-Temple Commission, was handed over for the guidance of the latter.

Government letter No. 336 of 1852, forwarding copy of a communication dated the 11th December last, from W. Elliot, Esq., Madras C. S., on the subject of cave-temples in India, was also delivered to the Cave-Temple Commission, and will appear in their general abstract of communications on these subjects, which will be published in the next No. of the Society's Journal. It makes mention of some caves not noticed in Dr. Wilson's Memoir, viz. at Badami ; Eiwally, a village on the banks of the Malpurba ; and at the village of Undavalli, on the banks of the Kistna ; also offers, for the use of the Society, sketches of the figures contained in the cave at the place last mentioned.

The Secretary was directed to forward the best thanks of the Society to Mr. Elliot, for his valuable communication, and to state that the sketches mentioned therein would be most acceptable to the Society.

The letter from J. J. Loth, Esq., states in reply to the Society's, proposing an interchange of journals with the Madras Society, that the Committee of the latter assent most willingly to the proposal,

and have directed a copy of all the numbers published since 1840, inclusive (viz. those which are not in the Society's library), to be transmitted by the first favourable opportunity for presentation to the Society.

The letter from E. Salisbury, Esq., Corresponding Secretary of the American Oriental Society, is accompanied by a copy of the last number of their Journal, and expresses their desire to keep up an interchange with the Journal of the Bombay Society.

The Revd. J. M. Mitchell read his paper on Zend Literature, (see p. 216,) being a continuation of one on the subject read about eighteen months ago. He briefly referred to the continuation by Dr. Roth of those investigations connecting the mythology of the Veda and the Zendavesta, which had been so skilfully commenced in his dissertation on the legend of Feridun. Mr. Mitchell's paper was mainly occupied with an explanation of the very important papers and works of Dr. Spiegel, Professor of Oriental languages at Erlangen, copies of which he laid on the table. The most important of these are—*1st*, Papers in the Journal of the Royal Academy of Sciences of Münich, and in the Journal of the German Oriental Society. These are chiefly occupied with the discussion of the criticisms on the text of the Zendavesta; *2nd*, A new translation of the 19th Fargard of the Vendidad, with copious notes, critical and explanatory; *3rd*, A Grammar of what the Professor calls the Parsi language; *4th*, An edition of the Zendavesta itself.

With regard to the new version by Spiegel of the 19th Fargard of the Vendidad, Mr. Mitchell submitted a translation of the German into English, and also an English version by Mr. Dhanjibhai Framji, of the Gujarati translation by Dastur Framji Aspandiarji. Doubts had often been expressed, and by none more loudly than some of the Parsis themselves, as to the correctness of Framjee Aspandiarji's version, and as no other translation into Gujarati is accessible, (the one executed by the late chief Dastur Edulji Darabji being locked up, apparently, in the archives of the Panchayet,) it is of importance to fix its value. The result of a careful comparison of the three versions aforesaid is, that while Anquetil is perpetually departing both from Spiegel and Framji, the latter two agree in most things of importance. Spiegel tells us that he has no acquaintance with Gujarati versions, so that this coincidence between the Professor and the Dastur is a strong *primâ facie* evidence that they are both right.

With regard to the "Grammar of the Parsi Language," the learned Professor has found, in studying the multifarious writings included

in the Zendavesta, and the works therewith connected, that the treatises included under what is temed *Pehlivi* are in fact in two different languages; and to one of these, for want of a better name, he has affixed the name Parsi language, and has entered, in the work in question, into a full examination of its character. He finds it intermediate between the proper Pehlivi (Huzvaresh) and the modern Persian. Many things in the latter, otherwise unintelligible, are cleared up by it. It seems related to the Deri dialect, to which, again, the idiom of the great national epic of Persia, the Shah Nameh, approximates. Besides this distinction in the works generally termed Pehlivi, the so-called Zend also divides itself on careful examination into two languages, or dialects. Spiegel finds that the 2nd Part of the Yaçna is written in an idiom very considerably different from that of the 1st Part, and apparently more ancient. He holds that the oldest part of the Avesta is the 2nd Part of the Yaçna, the next oldest the Vendidad, and the next the 1st Part of the Yaçna.—See this subject fully examined in a remarkable paper in Weber's *Indische Studien*, vol. i. pp. 303—315.

But the most important of all Spiegel's labours is his edition of the Zendavesta itself, which is now in the press at Vienna. A copy of the first part of the work was submitted to the Members present, and was much admired for the beauty of the typography. The Oriental part will consist of 3 vols. 8vo., and will contain the original text, the Pehlivi version, a copious list of various readings, and, finally, a German translation of the whole. The only edition of the Zendavesta procurable at present is a Bombay lithographed edition, a huge folio, which sells very dear. On this the elegant edition of the Professor will be an immense improvement.

The Society resolved to take two copies of the work, and to open a subscription list, which will remain in the library, for Parsis, and others interested in this matter, to put down their names for copies. The Professor's letters report his work as both "cheap and elegant," but he has forgotten to state the exact price. The whole Zend and Pehlivi will probably be under Rs. 15.

Mr. Fallon having forwarded to the Cave-Temple Commission three oil paintings, together with the plan and elevation of the Caves of Elephanta, they were laid before the Meeting, and gave great satisfaction. The Secretary was requested to take charge of them until the remainder were ready for transmission to Government.—12*th February* 1852.

A Copper-plate Charter was laid before the Society, respecting which the Revd. P. Anderson stated as follows:—"I place upon the table for inspection two copper-plates forwarded to me from Guzerat by A. Kinloch Forbes, Esq., who writes thus:—

"'I procured them from the aunt of the present Thakoor of Wulleh, after unheard-of difficulties. The old lady had shown them to several wise men of the East, who, as they knew nothing about the contents, merely returned them with the remark that the *treasure* alluded to in them was not in her *naseeb*. She made me promise to return them with my own hands, and let her know what the meaning of the inscription is,—also she insisted that the Thakoor should pledge his word that when the treasure was found she should have a fourth share; all which stipulations having been agreed to with due solemnity, she remarked that she had four or five other such, which I might see when the present was returned. They told me the plates were dug up with the others in the middle of the ruins at Walleh many—fifteen or twenty—years ago.'

"It is to be hoped that this old lady is not anticipating her good fortune, and living upon her great expectations. The letters on the plates, it will be perceived, can nowhere be very distinctly traced, and in many parts are quite illegible. However, I have ascertained that this is a grant of land made by King Síláditya of Valabhipura. A genealogical list of kings is given as usual, and their names are distinctly traceable. They are follows:—

"'1 Guha Sena; 2, His son Dhura Sena; 3, His son Síláditya; 4, His younger brother Isbara Graha; 5, His son Dhara Sena; 6, His younger brother Dhara Sena; 7, His son Dhara Sena; 8, His son Dhruva Sena.'

"This list is precisely the same as that given in the *Bengal Asiatic Society's Journal*, vol. vii. page 967, and three-fourths of their plates are similar to those of which an account is there given. The actual grant contained in the latter part of the inscription now before the Society is illegible, but perhaps some members of the Society may be able to decypher more than I have succeeded in decyphering. Síláditya is a family name, and probably the donor in this instance is Dhruva Sena, but it appears to be impossible to ascertain this with any degree of certainty."

The publication of No. xv. of the Society's Journal was announced.—*11th March* 1852.

Letter No. 1138 of 1852 forwards copy of a Census of Bombay, taken on the 20th August last, to be placed, as before directed, among the records of the Society for reference, but not for publication.

Colonel Twemlow, in his letter dated 10th ultimo, calls the attention of the Society to the remains, apparently of oyster shells, from their form and nacreous lustre, which are seen adherent to the trappean rock between Nagotna and Mhar, where the road is being widened, "just before descending to the level of Dazgaun, and the sulphur (hot) springs near that village." Colonel Twemlow considers the ridge cut through in widening the road to be about 100 feet above the level of the sea, and recommends a further examination of the spot, as he had not time or instruments to effect this.

Several impressions of long inscriptions taken from the rock-cut caves in the island of Salsette by Lieutenant Brett were laid on the table. The manner in which these have been obtained is most satisfactory. Mr. Brett uses Gutta Percha for this purpose. It is heated in water until sufficiently softened to admit of being spread over the rock, and pressed into the cavities of the letters. After this the letters, now in relief, are carefully smoothed down to a common level with a hot iron; printers' ink is then passed over them, and they are impressed on cloth or paper. As soon as a sufficient number of copies have been taken, the Gutta Percha is again boiled down, and applied over the next portion of the inscription, and so on until the whole is obtained.—*18th April* 1852.

The letter dated 14th ultimo, from H. B. E. Frere, Esq., Commissioner in Sindh, accompanied by the communication mentioned, (p. 458,) states that Mr. McLeod will be happy to send the Society specimens and descriptions of all the cartilaginous fishes obtainable at Kurrachee, for the Society's museum and Journal, should they be considered acceptable for these purposes.

The Secretary was requested to present the best thanks of the Society to Mr. Frere, and to state that the present would be highly acceptable, and the publication of Mr. McLeod's sketches and descriptions of universal interest, as well as any other contribution on objects of natural history in Sindh or its neighbourhood.

With reference to the antiquities sent from the plains of Gehrareh in Mesopotamia by Commander Jones, I. N., to the Government, and which had been submitted to the Rev. Dr. Wilson for examination, Dr. Wilson stated, that without further information respecting them, it would be impossible to give a satisfactory opinion of their age or

antiquarian value. That he did not think they were so old as had been imagined by Commander Jones, though he spoke with much deference on this point ; and requested that some observations, which he had prepared for the purpose, might be forwarded to Government, with a suggestion that they should be submitted for Commander Jones' consideration and reply, before the question of the final disposal of these remains was settled.

The Secretary was directed to act in accordance with Dr. Wilson's request.

The remains of the Batrachian reptile above mentioned, which is another animal added to those already found by Dr. Leith in the carboniferous shale of Bombay, appear to consist of the *tibiæ* of a frog, much larger than *Rana pusilla* of this formation. Dr. Leith concludes from measurement that they must have belonged to one at least three inches long, but until other parts of the skeleton are found this cannot of course be satisfactorily determined any more than the kind of reptile to which they did belong ; although there can be very little doubt of the latter.—10*th June* 1852.

With reference to the Government letter No. 2322 of 1852, requesting the Society to make known, as extensively as possible, the intention of the Society of Arts in London to hold an exhibition of the arts and manufactures of India in the spring of 1853, the Secretary was requested to take steps for carrying into effect the wishes of Government as soon as practicable.

The following letter was received from Barron Hammer-Purgstall, with the 1st vol. of his *Literaturgeschichte der Araber*, &c.

To the Secretary of the Asiatic Society of Bombay.

Sir,—If the Asiatic Societies of India are the first who claim the thanks of all Orientalists, for the spirit raised by them in Asia, Europe, and America, for the edition and translation of Oriental texts, they are also the first to whom I owe the honor of having been named their member. They rank therefore the first in the line of the seven Asiatic Societies, which are the object of the dedication of my history of Arabic literature.

Presenting the two first volumes of it to the honorable Asiatic Society of Bombay, in order to testify my respects and thanks, I have the honor to remain, with the highest regard,

Sir,

Your most humble and most obedient Servant,

(Signed) Hammer-Purgstall.

The Secretary was requested to acknowledge the receipt of this letter, &c., with the Society's best thanks, and to forward for the acceptance of the Author in return a copy of each of the numbers of the Society's Journal which are not out of print.—*15th July* 1852.

The Government letter No. 2653, dated 17th July last, stating that the Supreme Government had been pleased to sanction the appointment of Mr. Fallon for a further period of twelve months, was handed over for the guidance of the Cave-Temple Commission.

With reference to Commander Jones' note, offering to forward three beautifully sculptured slabs found among the ruins of Nineveh for the museum, if the Society would bear the expense of the water carriage from Nineveh to Bombay, the Secretary was requested to accept Commander Jones' kind offer, provided the expense was not very great, at the same time soliciting the Government to allow the slabs to be brought down by the H. C. vessels as far as might be practicable.

The Rev. Dr. Stevenson stated that he had examined the gold coins from the Purundhur and Sewnere talookas, submitted with the Government letters Nos. 4028 and 4201 of 1851, and was of opinion that they belonged to some Hindu coinage, but he had not seen any previous specimens of them. They are stamped on one side only, and bear a star in the centre, with a conch on one side, and the rudiments of rather ancient Hindu characters on the margin. Dr. Stevenson thinks that they should be sent to England, for the examination of some able antiquary.

No. xvi. of the Society's Journal was laid on the table.—*12th August* 1852.

The following propositions by the Honorable Sir E. Perry, Kt., President, which had been circulated for the opinions of the Committee of Management, were submitted to the Meeting :—

1st.—Members out of the Presidency shall pay only fifteen (15) Rupees per annum, for which they shall be entitled to a copy of the Journal.

2nd.—Officers of Regiments stationed in Bombay shall be allowed free access to the Library, on a written order from the Colonel of their Regiment, but shall not take out books to their private residence.

3rd.—Native students, in like manner, who desire to pursue their studies, shall be allowed free access to the library, on a written order from any Member of the Society ; the order mentioned in this and the last rule to last for a year.

These, after some discussion, having been modified, it was proposed by the Honorable the President, seconded by the Rev. Dr. Stevenson, and resolved unanimously—

That it is expedient to introduce alterations in the rules in accordance with the principles expressed in the above propositions, and that these be referred to the Committee of Management, with a request that the Committee will draw up some new rules in accordance with the spirit of them for consideration at the next Anniversary Meeting.

The letter from Lieutenant Brett was accompanied by a plan and facsimiles of all the inscriptions in the Caves of Nasik. Mr. Brett stated also that he was going on to the Caves of Ellora for a similar purpose.

Respecting the coins above mentioned, which were forwarded by Dr. Wiehe, and which fortunately happen to be more perfect specimens than those belonging to Government which were partly described in the minutes of last meeting, the Rev. Dr. Stevenson stated as follows :—

"The coins from the Purundhur and Sewnere talookas are what are called *Huns*. The *Hun* is the original coin from which the Madras pagoda, so named from the figure of a Hindu temple on the reverse, is derived. The Hun should be the third of a tola, or 60 grains ; the Madras pagoda is only 45.83, but according to Prinsep's useful tables, page 39, most of the older Huns weigh from 50 to 52.90 grains ; our coins weigh no less than 59 grains, which is within one grain of the full standard itself. I mention this, as it is of itself a considerable argument in favour of the antiquity of these coins. The form of the coins is singular, being somewhat like an oval shield, convex on the one side, and concave on the other. The convex side is unstamped, and the concave has in its centre a lotus (Kamal), which conventionally by the Hindus is figured with eight leaves. On the margin the letters *Shrí Ramá* are stamped in rather ancient characters, but not differing materially from the present Devanágari type : on the opposite side is the conch (Shankha), one of the emblems of Vishnu, with a bunch of pearls attached to it. To the right of the letters is a figure, which I suppose to be the head of the mace (Gada), another emblem of Vishnu ; on the margin opposite to this, is the discus or quoit (Chakra), a third of Vishnu's emblems. The coin, then, was probably struck by a worshipper of Ram, probably of the sect of Rama Nuja, which some centuries ago prevailed greatly in the Canarese country, on which Punderpoor borders. In looking over the list of Vijayanagar sovereigns contained in the twentieth volumne of the Asiatic Researches, and copied in Prinsep's useful tables, Table XLVI., I find that the family of Bukka, raised to the throne by

the famous Vidyáranya, was superseded by that of Sri Ranga in 1450 A. D. The former of these families were worshippers of Siva, which we know was the sect of their *Gurus*, but all the names of the latter family show they were sectaries of Vishnu Thus Sri Ranga's son was named Ram Chandra, his Narshina, and so on ; Krishna Deva, one of the family, extended his sway as far as Gujárat, but his son Ram Raja was killed during a Mahomedan invasion, and the kingdom, though not extinct till long after, was then shorn of its glory. Our coins, then, I should suppose, must have been struck by some one of those monarchs, in the palmy days of their sovereignty, when ruling over the best parts of the Deccan, from between the middle of the 15th and middle of the 16th centuries of our era."—*9th September* 1852.

Major Jacob's letter is accompanied by a translation of a Persian MS. entitled a History of Bokhara, which, at the suggestion of Sir Alexander Burnes, had been given to him in London in 1834, for this purpose, but which Major Jacob, after having perused a little, considered too puerile and inane to deserve further notice.

This having been represented to the Oriental Translation Committee, they were of a different opinion, and requested Major Jacob at his leisure to complete the translation : from various hindrances, however, Major Jacob has not been able to fulfil his task until the present time, and he has now forwarded the original with translation complete, for transmission to the parent Society.

The Secretary was requested to inform Major Jacob that, at the request of its Oriental Translation Committee, his translation, &c.would be forwarded to the Royal Asiatic Society by the earliest opportunity.

In reply to Dr. Buist's letter, calling the Society's attention to a memorandum of the Mahratta literature published at the lithographic presses of Bombay, which had been presented by R. X. Murphy, Esq., in November 1843, but never printed ; and suggesting the desirableness of a compilation of all information that could be obtained on the subject as a test of the intellectual progress of the people. The Secretary was requested to acknowledge Dr. Buist's communication with thanks, and to state that the Society, having been informed that the Rev. Dr. Wilson was engaged in drawing up a complete catalogue of all the typographed and lithographed works which had yet been printed for the "Deccan Vernacular Society," were desirous of leaving it in his able hands for the present.

The following letter was received from the Rev. Murray Mitchell, respecting the printing and translation of the Parsi religious books by

Professor Spiegel, and the Zend Dictionary under preparation by our member Dhunjibhai Framji :—

My dear Sir,—As I cannot attend the meeting of the Asiatic Society to-day, I shall be much obliged to you if you will kindly communicate to the Society the following extracts from a letter which I have recently received from Professor Spiegel, of Erlangen. It will be seen that this zealous Orientalist is making rapid progress with the important works he is bringing out in connexion with Parsi archæology.

In reference to his edition of the Zendavesta, the Professor writes as follows:—"The printing of my work is going on without interruption. The original text of the Vendidad is completed, the printing of the various readings has proceeded to the 6th Fargard [chapter] of the Vendidad; also the first five Fargards of the *Pehlivi Translation* are out of the press. In the course of the autumn of this year the first volume will be ready. As to price, the complete edition of the *Zendavesta* will cost at Leipsic six dollars (10 dollars=15 rupees), and will therefore at Bombay not come so high as 15 rupees. I think you will find the price cheap enough, when you consider that my edition will contain not only the Vendidad, Yaçna and Vispered, but also the Pehlivi translation of these works; also the yeshts, and the smaller liturgical pieces."

So far writes the Professor in reference to the Zendavesta in the *original languages*. An equally important subject is the translation of it which he is making. It was formerly intimated to the Society that Professor Spiegel was busy with a translation of the Zendavesta into German. He now mentions that the German translation of the Vendidad is ready (that is apparently out of the press).

But a still more interesting fact is that the Professor intends to furnish also a translation in *English*. He thus writes on the subject:—"As for the English translation, I shall gladly undertake it, and I shall enlarge the introduction for the use of English readers who have not the means of consulting the works referred to in the German edition. The Imperial Press of Vienna is willing to print the work in the same size as the edition on the original text."

Regarding Mr. Dhunjibhai Framji's Zend Dictionary, Professor Spiegel says:—"I have read the prospectus of the dictionary with much satisfaction, and I heartily wish the work may speedily be completed. I have not yet had time to collect subscribers, but I shall have the prospectus inserted in the next No. of the *Zeitschrift der Deutschen Morgenlandischen Gessellschaft*, [Journal of the German Oriental Society,] and I doubt not many copies will be subscribed for in Germany."

The Professor farther says in reference to his own work :—"Nothing can be more gratifying to me than to have my work brought to the notice of the Parsis, not so much in the hope of selling many copies (for as I have the patronage of both the Austrian and Bavarian Governments I have no pecuniary loss to fear), but because I am convinced that we may still learn much from the Parsis ; and I wish to get out of them what they do know as soon as possible, and before it vanishes entirely."

I trust that the last extract, as well as the warm interest which Professor Spiegel expresses in regard to Mr. Dhunjibhai Framji's Zend Dictionary, will stimulate some of our Parsi fellow citizens to literary investigation connected with their own ancient literature. In particular our zealous fellow member Mr. Dhunjibhai Framji must feel encouraged by the warm interest which the most learned Orientalists on the Continent take in his forthcoming work.

(Signed) J. M. MITCHELL.

The Rev. Dr. Stevenson V. P., read his paper on the Historical Names and Facts contained in the Kenery Inscription. The first name noticed was that of Chairakya, the celebrated minister of Chandragupta, the Sandracottus of the Greeks, who has a Cave dedicated to his memory under the name of Dramila. He then made some remarks on the name Rohinimitra, found in one of the inscriptions, which he endeavoured to connect with the royal family of which Pushpamitras was the founder, and the name of whose descendant, Deva Bhuti, written there Bhoti, appears at Carlee as the constructor of the elegant cave-temple near that place, and the name of one of whose sons is inscribed on the pillars in front of it ; leading us to infer that the cave must have been constructed about B. C. 70, at which time that sovereign reigned over Majadh, which he conceives received about that time the name of Maharashtra, "the great kingdom." He next mentioned that the names of two of the kings near the end of the Andhra dynasty, Gautamiputra and Yaduya and Sri-satkarni are found both at Kenery and at Nasik. This is the dynasty of kings mentioned by Pliny as powerful in his time, and which swayed the sceptre for four hundred and fifty-six years.

The latter of the two abovementioned kings is mentioned in the annals of China, where he is called Yuegnai, as having sent an embassy there in A. D. 428. The great Satraps of Western India, first the deputies of the Græco-Bactrian sovereigns, and afterwards independent monarchs, are also mentioned. A minister of one of them constructed a cistern at Kenery, and the son of one of them excavated a cave at

Nasik, whose date Dr. Stevenson makes out to be A. D. 484. Buddhaghosha, the Buddhist Apostle of Pegu and the Eastern Peninsula, who left India for Ceylon in A. D. 410, is also mentioned as having been at Kenery, and having dedicated there an image to Buddha.

The caves, as mentioned in the inscriptions, were intended to be some of them Buddhist temples, others convocation halls for the priesthood to meet in, others lodging houses for monks, others refectories and alms-houses. They were constructed by relations and connections generally of the above mentioned persons, or by rich goldsmiths of Calian and the neighbouring cities, or by devotees, who, having abandoned secular pursuits, seem thus to have bestowed their property ; the most curious fact, however, regarding the caves at Kenery mentioned was, that in the great tope opened a few years ago by Dr. Bird, there was originally deposited a Buddha tooth-relic. The date on the copper-plate accompanying it is plainly stated in words to have been the year two hundred and forty-five, which was A. D. 189. This relic is also mentioned in some of the rock inscriptions. The great cave is mentioned as then in existence, though it was not probably excavated long before that period.

Another curious fact in reference to the cave at Carlee is, that a Greek is mentioned in two of the inscriptions, and though there it is not expressly stated, Dr. Stevenson thinks it highly probable that he was the designer and superintendent of that excavation, which, as being the first, served as a model for the rest of these curious and laborious works.—14*th October* 1852.

Parts of Captain Charles Barr's paper on the Mangs of Kolapoor were read. It goes minutely into their mode of life at home and abroad ; of the parts which they inhabit ; their superstitions and their religion ; their forays, their precautions, and the distribution of their spoil. Everything almost connected with them appears in this valuable communication, but the vocabulary of their language, which the Society trusted the author would furnish, if in his power ; and if not, that some one in the Kolapoor district would kindly take up the subject, as the origin and early history of these races receives more elucidation from an inquiry of this kind, almost, than from any other investigation.—11*th November* 1852.

ANNIVERSARY MEETING.

MONDAY, 29TH NOVEMBER 1852.

The Minutes of the last Meeting having been read and confirmed, the following Report of the Committee of Management for the year 1851-52 was read by the Secretary:—

MR. PRESIDENT AND GENTLEMEN,—It is our pleasing duty to lay before you a more favourable report of the state of the Society's library, museum, and finances, than has fallen to the lot of your Committees of Management for many years past.

2. During the year 16 resident and three non-resident Members have been elected, that is 13 more than during 1850-51.

3. One hundred and seventy-seven books and pamphlets have been presented to the Society, and thirty donations to the museum.

4. The original communications have amounted to seventeen.

5. To the library 197 works, or 341 volumes, have been added to the different classes, as per annexed list, that is 40 works or 180 volumes more than last year.

6. 502 volumes have been bound or re-bound, and 24 repaired.

7. The greater part of the newspaper files have been stitched and roughly bound, while the rest are undergoing collation and the same process, so that within the next two months the newspaper room, which was in total confusion, and almost buried in dust, will have the whole of its contents cleared and arranged, and made easily available. It will require, however, the addition of a frame work round the walls, which will not be expensive, and which your Committee feel assured you will sanction.

8. The Alphabetical Catalogue is steadily progressing, and it is hoped will be ready for issue by the middle of next year.

9. The old process of stamping the Society's Books, which had been discontinued for long time, has been renewed, and nearly all the most valuable works now bear, on different parts, the impression of the Society's seal.

10. The Malcolmson Testimonial has been completed, the books stamped and lettered, and the whole form a handsome and valuable case, headed "Malcolmson Testimonial," in the Museum. The subscriptions with interest, amount to Rupees 2,732, 15 annas, 7 pies, of which Rs. 2,535, 12 annas has been expended, and the rest is kept for contingencies.

11. The museum has been almost entirely remodelled. The

additions and alterations in the cases sanctioned at the last Anniversary Meeting have been effected; and the additional space which has thus been gained has enabled the Conservator to group into separate departments, with room to spare, the different objects of natural history and antiquities possessed by the Society. These, which were for the most part strewed about the museum in confusion, have now each their proper place assigned to them.

12. One case has been devoted to specimens of the primitive and trap rocks with their minerals of Western India; another to a complete collection of the rocks of the island of Bombay, to which it is intended to add, in process of time, specimens of all the shells found on its shores, as well as specimens of the other objects of natural history which may be common or peculiar to it. The fossilized bones from the island of Perim have also been grouped into one case. Minor groups of minerals, rocks, and fossils, illustrative of the geology of the basaltic district of Western India, the primitive rocks of the Southern Mahratta Country, Cutch, Sindh, Arabia, and Aden, have been placed together in the tabular cases. Also collection of fossils from the older lakes of Central India.

13. The large collection of earthy minerals occupying that half of the tabular case next the Secretary's room has been re-arranged and provided with trays, also the collection of metallic minerals in the other half.

14. The shells occupy the upper part, or the tabular surface of this case, and are in process of arrangement. One case has been devoted to corals, which have been collected from the neighbouring seas. And the few other objects of natural history belonging to the classes of fishes, reptiles, and mammalia have also their separate apartments. So that everything now in the museum may be found in its proper place as far as general grouping is concerned; but they still require a most important addition to make them further useful; for in their present state they are little better than objects of mere curiosity—that is to say, they require to be named, numbered, and catalogued, that they may be made available for the purposes of instruction, and of greater interest to the passing observer. But this your Committee consider a work of time and labour, and one which can only be done under a person who is thoroughly acquainted with the specimens. Your Committee, therefore, cannot expect this to be fulfilled satisfactorily by any but a competent and paid Conservator.

15. The Society has published the usual number of its Journal, viz.

xv., for 1851, also a small number, viz. xvi., for the present year, and another is in the press, which will appear in January next.

16. The balance in favour of the Society is little less than that of last year.

Dr. Buist, seconded by T. L. Jenkins, Esquire, proposed :—

1st.—That this Report be accepted, and that the Society express their thanks to the Committee for the great care, labour, and ability with which it has been prepared.

2nd.—That the Committee be recommended to proceed with as little delay as possible with the Descriptive Catalogue of the Museum, without which it is impossible to attempt anything like a study of the specimens ; and that this, being completed, be published in an Appendix to the new Library Catalogue, now in progress of preparation, or in a separate form, as indispensable to make the Museum of any practical utility.

This was unanimously carried.

The following letter was read from the Hon'ble Sir E. Perry :—

"To the Secretary B. B. R. A. Society.

"SIR,—In consequence of my purpose to depart for Europe this day, I beg to tender the resignation of the offices of Vice-Patron and President, which I now fill by the favour of the Society ; and I respectfully offer my best wishes for the prosperity and yearly increasing usefulness of the institution.

"I am, sir, your most obedient Servant,
(Signed) "E. PERRY."

It was then unanimously resolved, on the proposition of P. W. LeGeyt, Esquire, V. P., seconded by G. Buist, Esquire, LL.D. :—

"That the Society record its deep sense of the valuable services rendered to it by the Hon'ble Sir Erskine Perry, during his Presidentship, and its regret that it should so soon have been deprived, by his departure to Europe, of the great advantage of his literary talents and acquirements."

Election of President.

P. W. LeGeyt, Esquire, seconded by A. Malet, Esquire, *Vice-Presidents*, proposed in an appropriate speech relative to his numerous and long continued labours in behalf of the Society, and his general literary attainments, that the Rev. J. Stevenson, D.D., should be elected *President* of the Society, in succession to the Hon'ble Sir E. Perry ; which, having received the general consent of the meeting, Dr. Stevenson returned thanks for the honor conferred on him, and

expressed his desire to continue, as heretofore, to further the objects of the Society to the best of his ability.

Election of Vice-President.

The election of the Rev. Dr. Stevenson to the Presidentship having caused a vacancy among the *Vice-Presidents*, Colonel C. Waddington, C. B., Chief Engineer, was, on the proposition of the Rev. Dr. Stevenson, seconded by Colonel W. Wyllie, C. B., unanimously chosen for this appointment.

The following Gentlemen were elected for the Committee of Management, Museum Committee, and Auditors for the ensuing year, viz :—

Committee of Management.

S. S. Dickinson, Esq.	J. Harkness, Esq., A.M.
Lieut. Col. J. Holland.	Captain J. G. Forbes.
William Howard, Esq.	Thomas L. Jenkins, Esq.
A. H. Leith, Esq.	J. Ritchie, Esq.
Rev. P. Anderson, A.M.	M. Stovell, Esq.

Museum Committee.

A. H. Leith, Esq.	J. Harkness, Esq., A.M.
H. Conybeare, Esq.	J. F. Watson, Esq., M.D.
G. Buist, Esq., LL.D.	H. J. Carter, Esq.

Auditors.

A. Spens, Esq. Captain J. G. Forbes.

In accordance with a resolution of the Society, passed at its meeting held on the 9th September last, that the Committee should bring forward propositions for the reduction of the subscription of non-resident Members—the issuing to all members a copy of the Journal gratuitously ; the admission of *bonâ fide* students gratuitously—and the admission of Officers of regiments stationed at the Presidency on a certain amount of subscription, it was resolved that—

1st.—Non-resident Members shall only pay fifteen rupees per annum.

2nd.—All Members of the Society shall be entitled to a copy of the Journal.

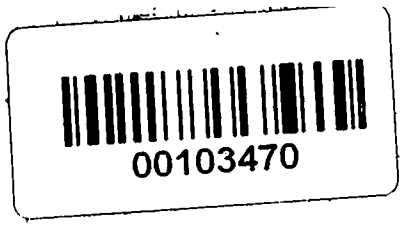
3rd.—Any Member of the Society may introduce (subject to the control of the Committee of Management) one individual, either Native or European, to the advantages of the library, while engaged in literary or scientific pursuits ; the Member being held responsible for any books taken out from the library by the person he has introduced, and the

introduction not to continue for more than twelve months, nor to be given to any but *bonâ fide* students of science or literature whose circumstances prevent them from joining the Society as regular Members."

The proposition for the admission of Officers of regiments stationed at the Presidency on a reduced amount of subscription was, after much discussion, again referred to the Committee of Management for further consideration.

The following work has been added to the "MALCOLMSON TESTIMONIAL":—

CUVIER (le Baron GEORGES) Leçons d'Anatomie Comparée, deuzième édition. Paris, 1836 à 1846, 9 vols. in 8.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